

THE ATOMIC ENERGY INDUSTRY:
AN EXPERIMENT IN HYBRIDIZATION*

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"The Socialists contend rightly that certain forms of property should be reserved to the state, since possession of them carries with it a kind of power too great to be left to private individuals without grave danger to the community in general. Just demands of this sort contain nothing that is opposed to Christian truth."

Pope Pius XI, *Quadragesimo anno*, May 15, 1931.

"Let me add that I think that the distinction is wisely drawn in S. 1717 between the realm of discussion and experimentation, where freedom is the only safe rule, and the realm of applied technology, where, in a matter that involves the national safety and welfare so vitally, social control is essential. The control that S. 1717 would impose upon the commercial production of fissionable materials and their utilization in industrial channels seems to me to be entirely justified. If the push of a button can destroy a city, no nation can afford to leave the button in private hands. That would amount to an abdication of sovereignty."

Secretary of the Interior Harold Ickes,
testifying before Senate Special Committee
on Atomic Energy.

THE release of atomic energy confronted the nation with a unique problem in social control. Recognizing the dangers inherent in this vast new productive resource, Congress launched a major experiment in government: it established the Atomic Energy Commission to supervise atomic development as a federal monopoly. The Commission has now been in operation for five years. It has engaged in research and production on a vast scale. Its plants, laboratories, depots, testing grounds and the like are not only spread over the nation but are located on distant islands in the Pacific; its annual budget now runs to more than a billion and a half dollars and may soon be drastically increased. Nevertheless, the American public, and even persons in responsible positions, have only the meagrest knowledge about the Commission's activities, even those phases which by no stretch of imagination may be considered as legitimately entitled to the prohibitions and protection of secrecy regulations.

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In the material that follows,—part of a comprehensive survey of the entire program,—an attempt has been made to explain certain aspects of the workings of the Commission, to trace the evolution of its policies as they are reflected in its production contracts and labor relations, and to evaluate these policies in terms of their economic and political implications. The discussion divides into four main sections. The first is concerned with the organization and structure of the agency itself; this examination, of independent importance, is also essential to an understanding of the Commission's substantive policies. The second and third sections deal with the production of fissionables and AEC contracts; the fourth with labor practices in atomic energy plants. I add a prefatory caution. It is evident that for a rounded appraisal of the Commission's record many other spheres of the program must be examined, a task I have undertaken elsewhere. Even so, since production of fissionables constitutes 95 per cent of the Commission's effort and expenditures, a survey of AEC contract and labor practices probes at the heart of the atomic energy business. Such a survey reveals, far better than a discussion of more dramatic topics—"fantastic" new weapons, say—where the government and the American people stand today, and which direction has been taken in the development of this new resource. I cannot claim in any sense to have exhausted the subject—however the reader himself may feel after perusing text, notes, and the other baggage of corroboration. The program is huge, most of its segments are closed to public scrutiny, and even the non-secret facts are not easily discovered. I shall be well satisfied if it is felt that I have opened issues, challenged thought, and provoked further disinterested inquiry.

SECTION ONE: ORGANIZATION AND STRUCTURE OF THE COMMISSION

I. THE COMMISSION

The Atomic Energy Commission is composed of five members, appointed by the President and confirmed by the Senate. The Commissioners must be civilians unless Congress specifically authorizes the appointment of a military man and they may not engage in "any other business, vocation or employment. . . ."¹

Congress added the somewhat unusual stipulation that in submitting nominations to the Senate the President shall set forth the experience and qualifications of each nominee. This provision was clearly intended to emphasize the importance Congress attached to membership on the Commission and to increase the likelihood of appointments based on qualification alone. The objective is laudable, but the device somewhat naive. The provision can scarcely

1. Atomic Energy Act of 1946, § (2) (a) (2) (B), 60 STAT. 585, 757 (1946). Hereafter this Act will be cited only by section.

be deemed an effective legal restriction on the President's free choice of Commissioners; indeed, it would be unfortunate if it were so interpreted. Furthermore, the term "qualification" is so vague that the Senate would be unlikely to reject a presidential nominee on the grounds that he was not "qualified." At most, the provision gives the Senate scope to rationalize its disapproval of an appointee because of his social or economic philosophy. The President has not carried out too seriously his obligation to recite qualifications; in practice he has limited the description accompanying each nomination to a brief, unadorned synopsis of the nominee's record. Yet the nominees have not invariably been so prominent or so uniquely qualified as to render altogether superfluous a more detailed explanation of why they were selected.

The five Commissioners, one designated as Chairman by the President, constitute the principal governing body established by the Act. The scope of the Commission's powers and duties, the dimensions of its opportunities, equal and perhaps exceed those of any government department ever before established. The Commission has, in formal terms at least, a plenary charter to do anything in the field of atomic energy that will promote the public safety and welfare. It is responsible for the control and development of all domestic phases of atomic energy; for carrying out federal production, research, and development programs; for issuing licenses relating to source material and technical application; for issuing and enforcing various regulations, including those pertaining to the protection of health and safety; for stimulating and supporting private research and developments; for controlling the release of scientific and technical information. It was only because of the magnitude, the complexity, and the unprecedented nature of the problems raised by nuclear energy that Congress, always jealous of its own authority, was moved to delegate such sweeping powers to an administrative agency. And no sooner was the Act passed, than a number of the more influential members of Congress, especially among the Republicans, regretted what they deemed an extravagant grant of power. Almost from the first, they have chivvied the Commission, imposed restraints on its freedom, influenced its policies; when other pressures have failed there have been threats to amend the Atomic Energy Act so as to recapture some of the authority originally conferred. Indeed, several minor restrictive measures have been adopted; they will be considered more fully in later discussions of the relations between the Commission and Congress. For the present, it is important to bear in mind that there is a large and growing discrepancy between the powers of the Commission as established in the organic legislation and the Commission's freedom of action in practice.

Form of Organization

The most important decision on organizational structure that Congress had to make in setting up the AEC was to entrust the broad powers it was

thought necessary to delegate in the Act either to a single administrator or to a directing board composed of several members.

The merits of the single administrator as compared with the plural board is one of the questions most voluminously discussed in the literature of political science, and today certain principles are recognized as doctrine. The following quotations from a report by the Brookings Institution on the executive agencies of the government provide an admirable summary:

"The arguments against the board are familiar: it diffuses responsibility; it is slow to act; it may be fitted to deliberate over policies, but it is not fitted to direct operations; since it is usually dominated by one man anyway, the dead timber should be removed, and the one dominating personality should be made solely responsible; only through a single head can an agency be made responsible through the chief executive and provision be made for cabinet representation; and finally, the advantages, without the disadvantages of a board may be obtained through the setting up of an advisory council.

"It may be granted that the presumption is usually in favor of a single head; and this presumption is strong where the activities are exclusively, or almost exclusively, administrative with little work of a quasi-legislative or quasi-judicial character . . . [but] when the new function is embryonic or experimental, a board may provide some assurance that the problems arising in the administration, evaluation and development of the function will be deliberately studied from all angles. In other words, while the actual function may be largely or wholly administrative, the important need during the period of experiment and transition is for policy making, i.e., quasi-legislation."²

Congress made its decision in favor of a five-member Commission on the ground that the exceptional circumstances listed in the paragraph above as justifying a departure from the general rule were present to an extraordinary extent in the Atomic Energy Act. Functions assigned to the Commission under the Act are "embryonic" and "experimental." The scope of the policy-making functions that Congress felt impelled to transfer in time of peace to an administrative agency seems startling even after the acceleration that the past two decades have brought in the practice of delegation by legislation. The Act confers powers whose exercise affects the national security, the progress of science, the value of billions of dollars of investments, and ultimately, perhaps, the whole structure of our society. The issues at stake, it was felt, were too intricate and too fateful to be decided by one man.

The fact that the legislative draftsmen of the Atomic Energy Act were aware of the faults generally attributed to a board is apparent from the measures

2. Report of Brookings Institution, June 19, 1937, to Senator Harry F. Byrd, Chairman Select Committee to Investigate the Executive Agencies of the Government.

they incorporated in the Act in an effort to forestall difficulties. Several provisions were designed to counteract the tendency of a plural-headed agency to chart its own course, with only a nominal dependence on the President and something less than effective integration with administration policies. The Commission is required to receive from the President at least once a year a directive governing the major issues of what quantity of fissionable material is to be produced and how that quantity is to be apportioned among various end uses. There is also in the Act a specific recognition of the fact that a five-member Commission cannot efficiently direct operations: provision is made for a general manager—also appointed by the President and confirmed by the Senate—whose primary responsibility is operational and who frees the Commission to devote itself to “policy” questions.³

No one could predict, to be sure, how well this organizational scheme would work, how closely atomic energy policies could be made to evolve along lines set by the Administration as a whole. It was known that with this agency, as with any other, success would depend in considerable part on the skill of the President’s staff in maintaining harmony throughout the government. This is a sphere in which no conspicuous success has been achieved, largely because of the mediocrity of the President’s advisors. It was known also that effective internal operation of the Commission presupposed a Chairman able to establish the proper relationship with his fellow commissioners and with the general manager. In this aspect of Atomic Energy Commission affairs the strong personality and views of David E. Lilienthal, its first chairman, had marked consequences that will emerge soon in this discussion. In the five years that have elapsed since the first Commission was appointed some crises of administration have taken place; experience has forced certain changes in the administrative system and may force others either by internal decision of the Commission or by legislation; Congress has at times been critical. Nevertheless, it seems clear that the multimember board system will be preserved.

Full Time vs. Part Time

The Act requires members of the Commission to serve full time, expressly directing that “No member of the Commission shall engage in any other business, vocation or employment than that of serving as a member of the Commission.”⁴

Almost every witness before the Senate Special Committee on Atomic Energy urged a full-time Commission. There were, however, some who advocated a part-time Commission; indeed, provision for such a governing body was incorporated in the May-Johnson bill, the discredited atomic energy con-

3. Section 2(a) (4) (A).

4. Section 2(a) (2) (B).

trol legislation put forward by the War Department. This proposal—that the complex and portentous responsibilities involved in the control and development of atomic energy should be entrusted to a group of part-time officials—must have sprung in part at least from ignorance or duplicity. It was the product either of a failure to understand the Commission's task or of a covert desire to make the Commission susceptible to the influence of private interests.

Because large corporations and great universities are managed—and often well managed—by part-time directors, it was contended that the same pattern of control would serve for atomic energy. The argument does not bear analysis. The analogy is false, since the nature as well as the magnitude of the tasks is altogether different, and it overlooks entirely the fallacious assumption on which such a part-time Commission would be founded—that it is possible to serve faithfully and concurrently both the public welfare and one's private business. War exigencies were held to justify exceptions to the established rule that no one should be permitted to retain his private business interests while acting in a position of official responsibility. The emergency may have justified this breach of principle, but experience with the dual loyalties of some of our wartime officials scarcely justifies an extension of the practice to times of peace.⁵

A more plausible argument is the well-established fact that an honest government official cannot expect to grow rich on his federal salary. Thus, it is said, men of eminence in business, industry, or professional life, cannot be expected to exchange their high income for the relatively meager pay of public service, and there is little possibility of enlisting men of outstanding qualification to serve the government, however important the post. Since 1946 Congress has to some extent improved the government salary scale. The 81st Congress, in 1949, provided for substantial increases in the pay of many high officials of the government. The reform, carried through the entire government structure, was made on a differential basis: the highest executive jobs received the largest proportional (and absolute) increases.⁶ The Atomic Energy Commission was not included in this legislation and in 1950, Senator McMahon proposed and obtained Congressional approval for increases in the

5. It is worth noting that in the last few years Congress has again departed from this sound precept. For example, the National Science Foundation, established in 1950 is run by a full-time Director and a part-time Board of 24 members. Defense mobilization may be expected to accelerate the trend to bring into government service men retaining their connection with private business and industry.

6. 63 STAT. 880 (1949). Under the legislation 253 top Federal officials received salary increases ranging from \$1,000 to \$7,500 a year. The new salaries run from \$14,000 a year for lesser officials to \$22,500 for cabinet members; this compares with the then existing scale of \$10,000 to \$15,000. President Truman had recommended \$25,000 a year for members of the Cabinet.

salaries of the Commissioners from \$15,000 to \$18,000 a year. The salary of the Chairman was increased from \$17,500 to \$20,000.⁷

There is no evidence, however, to show that the economic factor has been an obstacle to finding men to serve on the Atomic Energy Commission. Men of courage, integrity, and high abilities are always difficult to find, with or without high salaries to persuade their services. But they can be found—perhaps more frequently than we are accustomed to grant—and they sometimes combine with their other qualities a sense of social responsibility stronger than the instinct for personal gain. It is naturally less difficult to induce men enjoying high private income to serve as public officials if the tasks for which they are enlisted are of pressing and evident national importance. This, of course, can be carried too far. It would be unfortunate if government salary scales for important posts were held so low that only men of independent wealth could afford to take them. Certainly a position that carries with it such responsibilities and power as that of membership on the Atomic Energy Commission is, not without its appeal to ambitious men—even conceding that private industry might set a value on their services equal to several times their official salary. “The reward of the general,” Justice Holmes once remarked dryly, “is not a bigger tent but command.”

But there is another aspect. The Truman Administration has faced two problems in the appointment of men to high government office. One has been the rising cost of living, now partially compensated for by the increases granted in 1949 and 1950. The other has been the indignities and nagging calumny that Congress has visited on officials of the Executive Branch. This, coupled with a natural exodus of government officials at the end of the war and by reason of President Roosevelt's death, has drained public service of its best men and made it difficult to get others to replace them. Furthermore, President Truman has aggravated the difficulty by his penchant for appointing mediocrities and outright incompetents to leading posts. The Supreme Court is the best example of this. The results have been to make government service unattractive economically, intellectually, politically. Critics of the Administration have tended to stress the economic factor, which is only one of several, and perhaps the least important of the lot. The President, meanwhile, seems altogether unable to comprehend why he finds it so difficult to get good men to serve in his government.⁸

7. Pub. L. No. 820, 81st Cong., 2d Sess. (Sept. 23, 1950).

8. Overemphasis on the economic factor coupled with the problem of dual loyalty was illustrated in August of 1949 when President Truman nominated Carl Ilgenfritz, Vice President of the United States Steel Corporation, to be chairman of the Munitions Board. Mr. Ilgenfritz made his acceptance conditional upon his being permitted to take a year's leave of absence from his private industrial post at his full salary of \$70,000 a year and with retention of his retirement benefits, both of which the steel corporation was willing to grant. The nominee said that his financial responsibilities were such that

With this general picture in mind, what has the AEC personnel record been? There have been a few good appointments. Examples are David E. Lilienthal, Robert F. Bacher, Sumner T. Pike and William W. Waymack. There have been appointments in which salary clearly played no part; an example is Lewis L. Strauss who is independently wealthy. Some appointments have been poor or mediocre. On average, the President's choices have been not distinguished, but reasonably competent, and so far as is known, unhampered by the question of money. It is doubtful that if he had had his pick of high salaried executives, the President would have done any better. Issues of political philosophy, deference to the prevailing economic mores and complete acceptance of the principle of tight control over atomic "secrets" emerge as obstacles far greater than salary scales to the enlistment of good men.

Tenure

The Act provided that the first group of Commissioners was to be appointed by the President to serve two-year terms. As stated in the report of the Senate Special Committee, it seemed advisable to plan for complete reappointment of the Commission after a two-year period, during which both the President and Congress would have an opportunity to view programs as they evolved and to determine whether the membership, as well as the structure of the Commission was satisfactory. Thereafter, appointments were to be for five-year terms, but staggered by appointing one new member each year. This somewhat complicated scheme was designed to provide continuity in the Commission's activities. No limitation was placed on the number of terms a Commissioner might serve.⁹

On October 28, 1946, the President appointed a five-man Commission to serve until August 1, 1948. This slate was confirmed in the Senate after a lengthy struggle which centered upon its chairman, David E. Lilienthal, former chairman of the Tennessee Valley Authority.

he could not live on the \$14,000 a year which the chairmanship of the Munitions Board then paid. The Senate rejected the nomination on September 16, 40 to 28, after Senator Byrd of Virginia had charged that confirmation would amount to "permitting the United States Steel Corporation to subsidize the Chairman of the Munitions Board." Other examples are not wanting.

9. The method was to operate as follows:

- (1) Five Commissioners to be appointed for the term 1946-1948.
- (2) Five new appointments to be made in 1948 for terms: 1948-1949, 1948-1950, 1948-1951, 1948-1952, and 1948-1953.
- (3) One new appointment to be made in 1949 for five years to succeed the expiring appointment 1948-1949; one new appointment in 1950 for five years to succeed the expiring appointment 1948-1950, etc.

On April 20, 1948, the President, in accordance with the Act, submitted his nominations for the Commission as outlined in paragraph 2 of the schedule previously cited in Footnote No. 9. This was to have marked the beginning of the second stage of the staggered five-year tenure plan. The President renominated the original Commission, but for various complex reasons, involving mainly personal prejudices and partisanship, adumbrated in the subsequent debate again focussing on Lilienthal¹⁰ the nominations were not acted upon. Instead, the Joint Committee on Atomic Energy recommended that the terms of these Commissioners simply be extended for a year and eleven months to expire on June 30, 1950, thus postponing for two years the beginning of the staggered five-year tenure system. Congress accepted this extraordinary recommendation, and the President reluctantly signed the bill on July 3, 1948, charging in a sharp statement that the change had been made purely for political advantage. However, he felt constrained to sign the bill, he said, lest the "continuity and effectiveness of the national atomic energy program be impaired."¹¹

It is important to review some of the circumstances that surrounded this tenure bill. The charge of the President that "politics" were responsible for the change made by Congress was not without foundation. There were many members of Congress who disliked Lilienthal intensely, as was clearly shown in the bitter struggle over his confirmation in 1947, but this was by no means the whole story. It was a Republican Congress and a Republican-controlled Joint Atomic Energy Committee. The Republicans had reason to hope that there would also be a Republican president as a result of the 1948 elections. Therefore, a Republican president in 1950, when the extended terms of the Commission expired, could drop Lilienthal and appoint an entire slate satisfactory to the Republicans. Furthermore, he might either be re-elected in 1952, or, failing that, would have been in office long enough to make it difficult for the Democrats to change the make-up of the Commission when they returned to power.

The principal motive behind the action of Congress on this matter was political opportunism. While efforts were made during debate to justify the change on the ground that both the Commission and Congress needed longer experience with the Atomic Energy Act before the staggered five-year terms went into effect,¹² the Republican manoeuvre was simply another instance of

10. Lilienthal had been named to the first five-year term by the President.

11. The text of the amendment will be found in 62 STAT. 1259 (1948). The text of the President's statement, issued at the White House on July 4, 1948, will be found in the New York Times, July 4, 1948, p. 10, col. 1. A salient part of the statement was published in the BULLETIN OF THE ATOMIC SCIENTISTS, August, 1948, p. 248.

12. For a lengthy exegesis on this point see SEN. REP. No. 1342, 80th Cong., 2d Sess. (1948). (A REPORT TO ACCOMPANY S.2589, PROVIDING FOR EXTENSION OF THE TERMS OF OFFICE OF THE PRESENT MEMBERS OF THE ATOMIC ENERGY COMMISSION).

the old spoils system at work.¹³ Even some of the most prominent and highly-respected Republicans were guilty of complicity in this vote. Under the hypocritical guise of preserving unity, they contended that debate over the President's nominations might introduce controversy into the work of the Commission. This one supposes to have been one of the rarer blossoms of bipartisanship.¹⁴

Removal Power

The President is expressly authorized to remove any member of the Commission "for inefficiency, neglect of duty or malfeasance in office." Should the President ever seek to remove a Commissioner on any other ground and should the action be taken to court, the issues presented would fall somewhere between two Supreme Court decisions, one upholding and the other denying the President's power. The legal question is whether the functions of the Atomic Energy Commission are quasi-judicial or quasi-legislative or whether they are clearly executive in character. If the former, then under the doctrine of *Humphrey's Executor v. United States*¹⁵ the President's removal power would be limited to the causes stated. If, on the other hand, the Commission is held to be an arm of the Executive, then under the principles of *Myers v. United States*,¹⁶ the Act's attempt to limit the grounds of removal would be unconstitutional and the President could remove any Commissioner at will. In the most recent case, *Morgan v. TVA*,¹⁷ the court intimated that TVA's powers (closely analogous to the Commission's) were essentially executive. That Congress intended the removal powers to be limited seems clear from the legislative history: the original McMahon-Douglas bill permitted removal "at the pleasure of the President," but this language was replaced by the narrower clause appearing in the Act as adopted. Should the *Myers* case control, however, this implication of intent would become irrelevant.

Independent of his removal power, the President is given authority to overrule the Commission in all matters pertaining to the national defense. This

13. "This bill is the result of a Republican desire to determine the Commission's membership. It smells of patronage and patronage in a field where the principle may endanger the future of the Republic." New York Times, July 4, 1948, § 4, p. 6, col. 3.

"... The proposed compromise can only be viewed as a move of political expediency which sets a harmful precedent." (Memorandum to member associations and members, Federation of American Scientists, May 13, 1948.)

14. For a full discussion of this measure see 94 CONG. REC. 9067-73 (1948). Also see H. R. REP. 1973, 80th Cong., 2d Sess., pt. 2, (1948), for a Minority Report of the House Members of the Joint Atomic Energy Commission, which is sharply critical of the Joint Committee's recommendations for "extending the time of the expiration date of terms of the members of the Atomic Energy Commission from August 1948 to June 30, 1950."

15. 295 U.S. 602 (1935).

16. 272 U.S. 52 (1926).

17. 115 F.2d 990 (6th Cir. 1940), *cert. denied*, 312 U.S. 701 (1941).

will be discussed more fully later; the touchstone of effective cooperation between the President and the Commission is how infrequently he finds it necessary to use his authority. If the President's removal powers are in fact limited, and if marked and irreconcilable differences of view as to policy arise between one or more Commissioners and the President or between the Commission and other agencies, the President may be forced to use the veto power repeatedly to the detriment of the entire atomic energy program. Thus far, the President has not felt called upon to exercise his veto power. Indeed, so far as is known, he has found it necessary to intervene in Commission affairs only once in the last five years and then only as arbiter. On that occasion, as announced on July 24, 1948, the President supported the Commission by ruling that atom bombs should remain in its custody rather than be turned over to the Defense Department.¹⁸

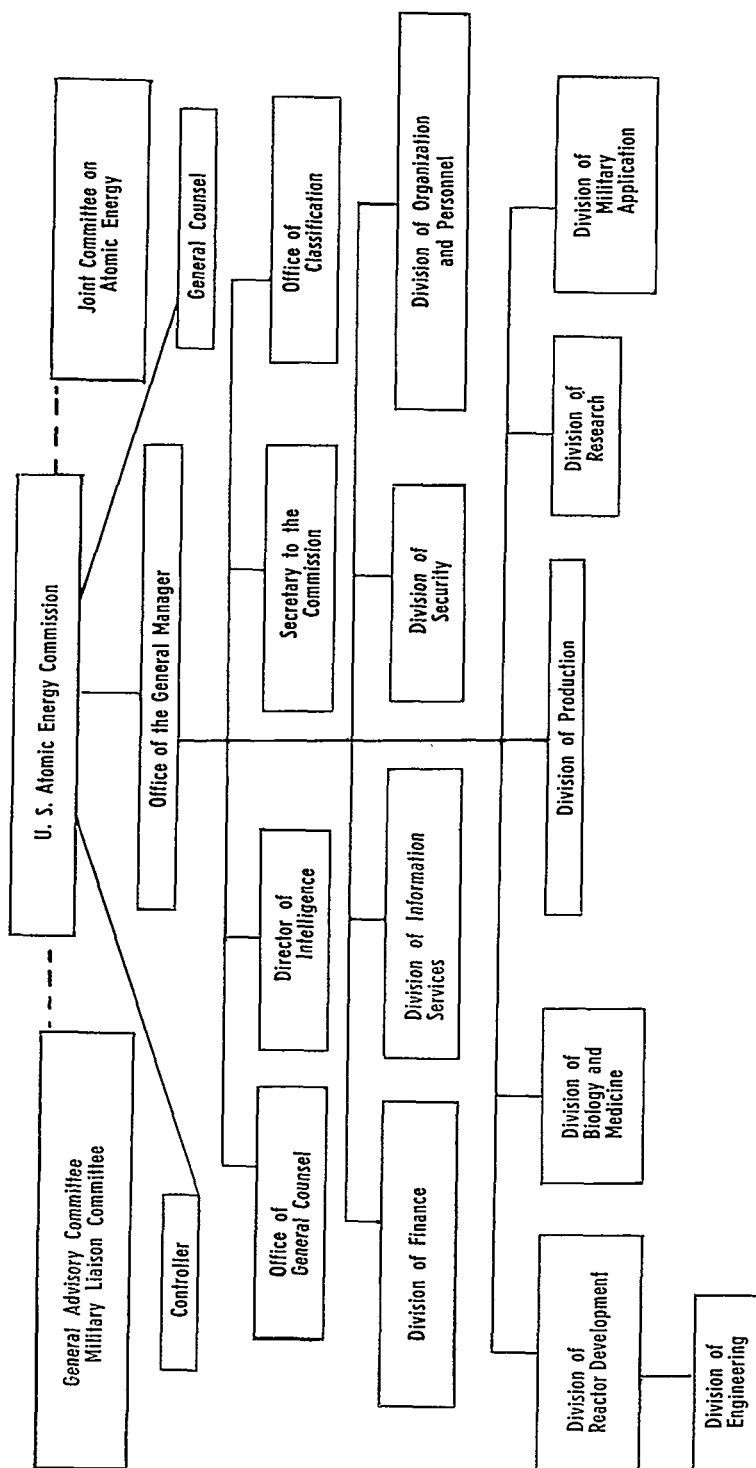
18. The fact was made known indirectly in a statement by the President on July 24, 1948, reviewing the first two years of activities under the Atomic Energy Act. Among other things, the President said:

"As President of the United States, I regard the continued control of all aspects of the atomic energy program, including research, development and the *custody of atomic weapons*, (italics mine) as the proper functions of the civil authorities."

So guarded was his language and so secretive the activities of the Atomic Energy Commission in the military sphere that it was not until the testimony of Lilienthal before the Joint Congressional Committee Investigating the Atomic Energy Commission in June of 1949 that the full significance of the President's statement emerged. At that time Lilienthal called attention to the Presidential statement in response to charges that he and the military had "argued for two years over custody of the atomic bomb." *Hearings before the Joint Committee on Atomic Energy on Investigation Into the United States Atomic Energy Project*, 81st Cong., 1st Sess. pt. 9, 419 (1949).

In his diaries Defense Secretary Forrestal noted that on July 21, 1948 the National Military Establishment made a formal request at a White House meeting for an executive order turning over custody of bombs to the latter. Lilienthal objected. The President reserved decision. Two days later Truman told Forrestal "he would make a negative decision on the question of the transfer of atomic bombs and said that political considerations, at the immediate moment, had influenced this decision. He indicated that after election it would be possible to take another look at the picture." The next day Truman declared publicly that he regarded control of all aspects of the atomic energy program, including custody, as functions of the civilian authorities. Privately he also told Forrestal he proposed to keep the decision when to use atom bombs in his own hands because he did not wish "to have some dashing lieutenant-colonel decide when would be the proper time to drop one." MILLIS & DUFFIELD, *THE FORRESTAL DIARIES* 460-1 (1951).

U. S. ATOMIC ENERGY COMMISSION ORGANIZATION CHART



II. ORGANIZATION SUBORDINATE TO THE COMMISSION

General Manager

The highest operating official of the Commission is a general manager who until the Act was amended in 1950 was appointed by the President with the advice and consent of the Senate, his salary fixed equal to that of the Commissioners (the Chairman excepted) with no limit set upon the length of his term. The Act placed the General Manager under the supervision and direction of the Commission and authorized him to assume only such functions as they might delegate.¹⁹ Of course, in the discharge of delegated duties the General Manager must exercise considerable judgment and assume a degree of real autonomy. The post of General Manager was created to free the Commission from administrative burdens and to mitigate, in some measure, the disadvantages of the multi-member form of control. How successful the device was to be would depend upon how effectively the Commission could divide the execution of policy from its formulation, how much power it would formally delegate, how great independence of judgment and action it would tolerate in a General Manager.

It may be noted that during the early years the post of General Manager was of even greater importance than was perhaps foreseen when the Act was passed. An exceedingly broad scope of functions was delegated to the General Manager by the Commission partly because it was thought that the vast and ramified atomic energy program could be effectively run only by a single managing director; partly because the Commission, embroiled from the outset in political problems arising out of its relations with Congress, found little time to study daily operations; and partly because Lilienthal and Carroll Wilson, the first General Manager, had worked closely together previously. The General Manager's power and importance were still further enhanced by a policy agreed on by the Commission shortly after it was appointed in 1946. It was decided that individual Commissioners were not to assume responsibility for separate phases of Atomic Energy Commission operations; instead, the Commission as a whole was to take the joint responsibility for the entire program.²⁰ One consequence of this decision was to remove

19. Section 2(a) (4) (A):

"There are hereby established within the Commission—(a) a General Manager, who shall discharge such of the administrative and executive functions of the Commission as the Commission may direct. The General Manager shall be appointed by the President by and with the advice and consent of the Senate, and shall receive compensation at the rate of \$15,000 per annum. The Commission may make recommendations to the President with respect to the appointment or removal of the General Manager."

20.

"The Commission has adopted as a fixed policy, what I think is the only possible workable policy; and that is that the work will not be divided as to administration between members of the Commission and its Chairman. We will act as a body to

from the Chairman certain powers which ordinarily would have been vested in his office and to increase correspondingly the responsibilities of the individual commissioners. Another consequence was that the General Manager, as a full participant in the Commission's discussions, inevitably shared in this distribution of authority.

The benefits of this scheme of joint action are open to debate. It can be argued that the policy aggravated the General Manager's burdens, led to inefficiency, and paved the way for the drastic reorganization of the post effected by amendment of the Atomic Energy Act in 1950. With none of the Commissioners responsible for separate provinces of the program, the General Manager would be obliged to lay problems requiring decision before the body as a whole, a time consuming procedure and one which undercut the principle, advocated by Lilienthal, that the Commission should concern itself primarily with "high policy." On the other hand the scheme was blessed by a kind of easy informality not usually found in large enterprises. The General Manager could dispense with the protocol of channeling communications through the Chairman; he was free to discuss every aspect of the program with any of the Commissioners and gain the benefit of individual counsel. This much may be reckoned a clear gain for sensible, flexible administration. The joint-action policy, in any case, will be seen to play an important part in various operations considered throughout this study.

From the first the Commission conferred on the General Manager broad powers and unusual privileges. He attended Commission meetings and prepared the agenda; although without a vote he was invited to participate in all Commission discussions and was not merely conversant with the framing of policy but played a major part in its evolution. The responsibility for carrying Commission decisions into effect was exclusively his. All operating and administrative divisions, and regional offices were under his jurisdiction. The rules and regulations affecting every phase of the atomic energy business were subject to his approval and promulgated in his name. He frequently represented the Commission at Congressional hearings, notably those before the appropriations committees. Without going more fully into the many sided and complex pattern of his work, it can be seen that the General Manager had great responsibilities and authority sufficient for their discharge.

Many of these powers and responsibilities are today retained by the General Manager. Nonetheless the post has suffered a reduction of authority as well as prestige since Lilienthal's departure from office. The circumstances

plan and evaluate programs to determine upon policies, and to provide a means of their execution through a general manager. That will be adhered to. There will be no part of the work which the Chairman will do and another part which each of the other Commissioners will do."

David E. Lilienthal, *Hearings before the Senate Section of the Joint Committee on Atomic Energy on Confirmation of the Atomic Energy Commission and the General Manager*, 80th Cong., 1st Sess. 27-8 (1947).

surrounding this revision deserve attention. It is necessary, in this connection, to consider briefly the administrative doctrines espoused by Lilienthal, doctrines underlying the pattern initially adopted by the Commission.

Lilienthal, as we have observed, was strongly committed to the view that industrial corporations should run the atomic energy program. This course alone would in his opinion assure success in weapons production as well as in the development of peacetime uses of atomic energy. The "corollary" to private management was administrative decentralization of the Commission. If the important end of the business was in the field, the brunt of operating decisions should fall on the regional offices which would be in close touch with the contractors in their area, and therefore best qualified to solve the problems that arose. Lilienthal conceived of a division of authority as follows:

- (1) The Commissioners to concern themselves almost exclusively with "high policy."
- (2) The General Manager to direct all staff operations, and to supervise the regional offices.
- (3) The Staff divisions to be responsible for "planning, review and evaluation of the work of the Commission" under their respective functional categories but to exercise no control over operations in the field.²¹
- (4) Regional managers to be semi-autonomous in their dealings with contractors and to report only to the General Manager.
- (5) Private contractors to have full control of their projects and to be exempt from "bureaucratic" supervision, especially from Washington.

That this conflicting arrangement of powers led to confusion and, occasionally, serious breakdowns is hardly to be wondered at. What is remarkable is that it worked at all.

Not long after the Commission got underway there were signs of trouble. With the managers of field operations and all division heads reporting to the General Manager, he was soon deluged with detail and unable to attend to the "execution of pressing programs."²² The organization of the AEC staff on functional lines in Washington, on geographical lines in the field, worsened the confusion. Area managers were in need of the expert advice which could be provided only by members of the headquarters staff divisions but were formally denied access to these sources; the staff divisions charged with the evaluation of programs had no direct communication with the field. "The situation, if continued, might even have tempted area managers to take matters

21. ATOMIC ENERGY COMMISSION, FIRST SEMI-ANNUAL REPORT 6 (1947) (hereinafter cited as SEMI-ANNUAL REPORT).

22. *Investigation into the United States Atomic Energy Program, Report of the Joint Committee on Atomic Energy*, SEN. REP. No. 1169, 81st Cong., 1st Sess. 21 (1949). (Hereinafter cited as SEN. REP. No. 1169).

more and more into their own hands."²³ It is not surprising that almost from the first this medley of relationships drew criticism.

Individual members of the General Advisory Committee counselled their chairman that a reorganization was needed which would substitute functional for regional authority. Dr. Oppenheimer so advised the Commission.²⁴ The Industrial Advisory Group recommended at least two important changes of administrative structure. The first of these related to the swollen responsibilities of the General Manager who, in their opinion staggered under an "intolerable burden."²⁵ The second concerned the jurisdiction of the field managers and the need for "establishing the functional lines of authority which in our opinion would best promote the Commission's objectives."²⁶

In response to criticism and in light of its own studies, the Commission in the summer of 1948 "modified the flow of administrative authority." Division directors who had formerly served in a staff capacity were "interposed" in the line of authority between the General Manager and the area managers and given direct supervision over field operations.²⁷ Thus, the Production Division took over direction of offices concerned with producing raw, feed and fissionable materials; the Reactor Division (newly established) assumed responsibility for field offices engaged in reactor development; the Division of Military Application was granted authority over the Office of Santa Fe (Los Alamos) Operations; the Division of Research became responsible for the programs, budget and technical supervision of all of the major national laboratories (except Argonne and Knolls). The result of these changes so far as the General Manager was concerned was a lightening of his duties and a diminution of his active supervisory control, if not of his ultimate authority. The post of Deputy General Manager was created further to relieve the principal officer. Another aspect of the reorganization was a limitation on the contract authority

23. *Ibid.*

24. *Hearing before the Joint Committee on Atomic Energy on Investigation into the United States Atomic Energy Project*, 81st Cong., 1st Sess. pt. 7, 307 (1949).

25. INDUSTRIAL ADVISORY GROUP, REPORT TO THE UNITED STATES ATOMIC ENERGY COMMISSION 18 (Mimeographed, AEC release Dec. 15, 1948).

26. *Id.* at 20;

"Study of the Commission's activities in the light of our own experience with large industrial organizations led to the conclusion that the powers vested in the several field managers covered staff, scientific, and engineering authorities to an extent we considered unsound. Decentralization is a laudable objective. But under the decentralized method of operation which the Commission then had in effect, the activities within the jurisdiction of the field managers were determined by geographical location rather than by the type of activity or its relationship with other activities. The result was lack of essential coordination." *Id.* at 18-19.

27. SEN. REP. NO. 1169, 81st Cong., 1st Sess. 21 (1949).

"Within the Washington office . . . certain division directors who had served in a staff capacity were given direct responsibility under the General Manager for the major programs of the Commission—research, production, engineering, military application, biology and medicine, and the development of reactors."

FIFTH SEMI-ANNUAL REPORT 139 (1949).

of area managers. It cannot be said however that the limitation was stringent: the Hanford and Oak Ridge managers were given authority to approve single contracts involving \$5,000,000; in other field offices, New York for example, the ceiling was set at \$2,000,000. On the whole it would be correct to say that area managers substantially retained their independence. Divisional offices in Washington defined the programs which would effectuate the policies of the Commission; the field offices were then permitted considerable latitude in carrying out the programs. Communications were improved between the field and Washington; periodic progress reports on construction projects were required of the area managers and their staffs; in turn they were to maintain "daily contact with the contractor."²⁸ Once the system went into effect area managers consulted frequently with divisional directors and, if the need arose, with the General Manager.

Despite its renovation the AEC structure of command continued to meet criticism. The Industrial Advisory Group reported that while the reorganization was undoubtedly a forward step, it did "not go far enough to result in maximum efficiency either from the standpoint of the Commission's internal operations or from the standpoint of increasing industrial participation in atomic energy development."²⁹ There is evidence that the area managers were not always diligent in posting Washington officials on plans and commitments. Waste, duplication, and other forms of inefficiency characterizing certain field operations were ascribed by Congress to excessive decentralization.

It is important to regard the effect on the General Manager's status of political circumstance. We have remarked the close relationship between Lilienthal and Carroll Wilson. The high confidence reposed in the General Manager, his role in framing AEC policy, the immense powers delegated to him were concomitants of Lilienthal's trust and of Lilienthal's own pre-eminence in Commission affairs. Inevitably, as Lilienthal fell under political attack, and as the doctrines he espoused, particularly as to administration, evoked censure even within the Commission itself, the question of Wilson's standing was drawn into controversy. There were some who felt that his limited experience in large scale industrial management was responsible for certain administrative and operational difficulties. Others expressed doubt that it was good practice for the Commission to delegate so much authority to one individual, regardless of his competence. Even those who advocated

28. SEN. REP. NO. 1169, 81st Cong., 1st Sess. 21 (1949).

29. INDUSTRIAL ADVISORY GROUP, *op. cit. supra*, note 25. The Report pointed out that in many phases of the reorganization plans the "concept of functional direction seems to take second place to the accidents of geography. The Director of the Division of Production, for example, is given authority over the Oak Ridge, Hanford and New York installations which are concerned not only with production, but also with important research and development activities. This same combination of headquarter's direction based in part on function, and headquarter's direction based on location of activities appears to be present in other features of the reorganization plan." *Id.* at 21.

a tightening of central controls had in mind an increase in the responsibilities of the Commission and the divisional directors rather than the General Manager. But what some students regard as the decisive factor in narrowing the scope of this post was the attitude of the Joint Committee. Since Wilson was closely identified with Lilienthal, and unswervingly loyal to him in expressing his views as a witness before Congress, he incurred the hostility of those who had no use for his chief. The faults of the organization were frequently pinned on him; when the Commission was reprovved for its failure to take a more direct interest in operations, the plain implication was that excessive authority had been delegated to the General Manager. Congress to be sure had created the job for the very purpose of mitigating the disadvantages of "management by committee"; but Congress, it now appeared, felt the Commission had been overzealous in divesting itself of operational responsibility.³⁰

While Lilienthal was chairman, no formal steps were taken, other than those already described, altering the powers and responsibilities of the General Manager. The change in conception of the power balance involving the Commissioners and the General Manager was therefore concealed from public view. With Lilienthal's resignation and the appointment of Gordon Dean as successor, it was safe to predict that the General Manager's authority would be further curtailed, and the curtailment given official and explicit sanction. It might be supposed that the simple recall of certain of the powers originally delegated to the General Manager would have sufficed to achieve the desired end. In fact, the Commission, under Dean, sought a more drastic revision, one which Wilson regarded as insupportable. The key lay in lowering the hierarchical eminence of the position.

Tremendous prestige accrues to a government officer who is appointed by the President and confirmed by the Senate and who thereafter enjoys an indefinite term subject only to the President's power of removal. These honors were enjoyed by the General Manager until 1950, when Senator

30. For an interesting discussion of this point see DAHL & BROWN, *ATOMIC ENERGY AND THE SOCIAL SCIENCES* 44. (Preliminary Draft of a Research Memorandum. October, 1950, (not published; to be obtained from the authors at Yale University). They state:

"The pressures from Congress and the executive branch have tended to convert policies decided in the field to policies decided in Washington. The close relationship between the Commission and the Joint Committee have made the Commission feel it must have in its own possession the information necessary to answer questions put by members of the Joint Committee; and controversy in the Committee over decisions taken in the field has tended to convert such questions automatically into high policy. . . . During the lengthy investigation of 1949, Senators frequently displayed impatience because those who had information or who had taken policy decisions that were under examination were not on the Commission staff but in the field. The investigation evidently speeded up a process of centralization within the Commission, which some employees of the Commission now feel threatens to deprive it of the advantages propounded by the decentralist doctrine."

McMahon introduced an amendment³¹ by which the incumbent of the post, while still to be designated by the President and confirmed by the Senate would have been appointed for only a three-year term. Several months later, largely on the suggestion of the Atomic Energy Commission itself, this amendment was altered to eliminate the participation of the President and the Senate in the appointment and to make the General Manager the direct appointee of the Commission to serve "at the pleasure of the Commission."³² The General Manager's salary, hitherto fixed by statute, was to be set at the Commission's discretion, but not to exceed \$20,000. These changes in the status of the General Manager were voted by Congress without debate,³³ and were signed by the President on September 23, 1950.

Whether this action was taken as a result of a personality clash between Congress and the Commission's first General Manager will not be discussed. But it may be noted here that the Joint Committee on Atomic Energy justified its action by (unanimously) reporting to Congress that inasmuch as the Commission itself was ultimately responsible for its own work, the Commissioners "should wield corresponding authority with respect to the General Manager, the executive officer upon whom they must rely."³⁴

Supporters of the legislation contended further that under the original Act the General Manager, through longevity in office, might gain authority beyond that contemplated by its authors. As evidence to sustain this con-

31. S. 3437, 81st Cong., 2d Sess. (1950). The portion of the Bill amending Section 2(a) (4) (A) of the Atomic Energy Act substituted for the original:

" . . . a General Manager, who shall discharge such of the administrative and executive functions of the Commission as the Commission may direct. The General Manager shall be appointed by the President, by and with the advice and consent of the Senate, and shall receive compensation at the rate of \$20,000 per annum. After June 30, 1950, the General Manager shall be appointed for a three-year term, and the first such appointment for a three-year term shall be made with respect to a term beginning July 1, 1950. In cases where a General Manager is appointed and vacates his office before the expiration of three years, his successor shall be appointed for a three-year period commencing on the date of taking office. The Commission may make recommendations to the President with respect to the appointment or removal of the General Manager."

32. S. 3437, 81st Cong., 2d Sess. (1950). Reported by Senator McMahon with amendments; SEN. REP. No. 2493, 81st Cong., 2d Sess. (1950). This amended bill further amended S. 3437 with respect to the General Manager to read:

" . . . a General Manager, who shall discharge such of the administrative and executive functions of the Commission as the Commission may direct. The General Manager shall be appointed by the Commission, shall serve at the pleasure of the Commission, shall be removable by the Commission, and shall receive compensation at a rate fixed in the Commission's discretion but not to exceed \$20,000 per annum."

It was in this form that the bill was enacted into law. (Pub. L. No. 820, 81st Cong., 2d Sess. (Sept. 23, 1950)).

33. The Senate passed the bill on September 13, 1950, and the House on September 23, 1950.

34. SEN. REP. No. 2493, 81st Cong., 2d Sess. (1950).

tention, they testified that bureau directors of certain other federal departments often entrenched themselves and aggrandized their authority to the point where it was difficult, if not impossible, for the heads of their departments, or for the President, for that matter, to carry out policies with which the bureau directors were not in sympathy. Nevertheless, it could still have been argued that the semi-independent status of the General Manager, devised as a counter-balance to the multi-membered Commission was still a valid concept. Removal for cause should, in the opinion of many students of government, be the only justification for dismissing an operating official of this kind; otherwise it is impossible to build up a sound civil service. Carroll Wilson, who had resigned shortly before the legislation was adopted, was the chief critic of the amendment. He contended that the General Manager had been reduced, by the amendment, to "a sort of executive secretary to a management committee" adding that such committees are notoriously inept in the day to day operation of large undertakings.³⁵

The two viewpoints are obviously subject to debate and it is unfortunate that the Joint Committee recommended the changes without public hearings and that Congress adopted the legislation without any discussion whatever.

It would mislead the reader to leave him with the impression that the Commission's policy of sharing authority has substantially diminished the Chairman's prestige or stripped him of his special powers. As the officer presiding at Commission meetings, the Chairman assumed the highly delicate task of driving through Commission business. His post of leadership involves him in many more ex-officio duties than fall to other members of the Commission. He is the American member of the Combined Policy Committee, the other two members of which represent Great Britain and Canada; he appears for the Atomic Energy Commission on numerous special committees set up by the President; he is formal spokesman for the Commission and its mail is received and answered in his name. Finally, he is the chief witness and spokesman before Congressional Committees.

Operating Divisions

The Atomic Energy Act established four operating divisions—Research, Production, Engineering, Military Application—accountable to the Commission through the office of the General Manager.³⁶ The Commission later enlarged and modified this framework, adding four more divisions, Reactor Development, Biology and Medicine, Raw Materials, and Construction and Supply, and altering the lines of authority as indicated in the preceding section.

The Production Division has supervision over all manufacturing phases of fissionable material and controls the AEC production plants at Oak Ridge

35. Quoted in the *Washington Post*, September 25, 1950, p. 2, col. 1; and see *id.*, Aug. 9, 1950, p. 1, cols. 2, 3, p. 11, col. 3.

36. Section 2(a)(4)(B).

(Tennessee), Hanford (Washington), Paducah (Kentucky), and Savannah (Georgia). Initially it was responsible for the acquisition and production of raw materials and the reduction of these to refined feed materials; these functions were discharged respectively by the Division's Raw Materials Operations Office and New York Operation's Office. In the spring of 1951 the AEC established a Division of Raw Materials to take over the functions of the Raw Materials Operations Office; the status of the New York Operation's Office, however, remained unchanged. In place of a "New Operations Office," originally responsible for the Savannah plant, the Commission organized, within the Production Division, the Savannah River Operations Office; also, a Kentucky Area Office (for Paducah) and a Fernald Area Office for the new feed plant in Ohio.³⁷ In line with the Commission's policy of decentralization, these and other field offices enjoy considerable independence, each being under the direction of a resident operating manager reporting to the Division of Production.

The Division of Reactor Development is assigned the task of studying and constructing new types of reactors which may improve upon those already in operation by developing power and consuming fissionable material more efficiently. This Division was created in 1948 and has three operations offices under its supervision: at Idaho Falls, Idaho, Chicago, Illinois, and Schenectady, N. Y.³⁸

A Division of Engineering was established by the Act to plan and construct new facilities.³⁹ It is now a part of the Division of Reactor Development, but it retains technically its status as an operating division because of its statutory character. The Engineering Division is mainly concerned with the chemical engineering problems of the Commission's reactor program, the development of processes for the extraction of uranium from depleted nuclear fuels and the disposal of radioactive waste matter.

A Division of Construction and Supply was created by the Commission in June 1951 to supervise "construction and related engineering activities for all parts of the AEC program." It administers relations with the defense program "including priorities, allocations, and the Controlled Materials Plan," handles the licensing of fissionable material production facilities and controls over exports of atomic energy equipment, and "exercises staff supervision

37. TENTH SEMIANNUAL REPORT, 3, 19 (1951).

38. The Idaho Operations Office administers a portion of the Commission's program for the development of reactors and is in charge of the Idaho Falls Reactor Testing Station site. The Chicago Operations Office administers the Commission contract with the Argonne National Laboratory (University of Chicago, contractor) for research and development of reactors. The Schenectady Operations Office administers the contract of the Knolls Atomic Power Laboratory (General Electric Co., contractor) for the development of power reactors.

39. Section 2(a)(4)(B).

over AEC arrangements for transportation and communications—also over the procurement, storage, utilization, and disposal of materials, equipment, supplies, and real estate and the management of records.”⁴⁰

The Division of Research has a curious legislative background. In scientific research the Commission has a dual responsibility: to conduct its own programs and to promote and support independent research in industry and universities. The Research Division is charged with the first of these functions. It is expressly prohibited from engaging in the second. Section 2 (a) (4) (B) provides:

“The Commission shall require each such division to exercise such of the Commission’s powers under this Act as the Commission may determine, except that the authority granted under Section 3 (a) (i.e., to furnish research assistance to private or public institutions or persons) . . . shall not be exercised by the Division of Research.”

This latter prohibition was based on the theory that it would be unwise to place the Division of Research in a position to determine how funds earmarked by Congress for research should be apportioned, as between government and private activities. Its sponsors argued that research cannot be judged by the standards applied in other government enterprises; that is to say, while in other fields it may be desirable to avoid competition between the government and private interests, progress in scientific research frequently depends on a concerted and cooperative attack on common problems by many scientists in different laboratories. Competition among scientists toward the same goal is likely to accelerate rather than retard its attainment. In this circumstance, a single unit of the Commission should not have the power to determine the pace and scope of both its own research program and that of its competitors. By this separation of functions, the Research Division was theoretically enabled to conduct the scientific projects of the Commission and formulate its own programs just as would a private laboratory. It was to cooperate with other laboratories in the same spirit and toward the same end as scientists have always done. But it was not to control, financially or otherwise, research outside the Government.

In practice, the Commission has not conducted research projects with its own staff, but has preferred to operate all its laboratories (with one minor exception)⁴¹ under contract. For applied and basic research, the Commission

40. TENTH SEMI-ANNUAL REPORT 60-1 (1951).

41. The only major AEC-owned laboratory directly operated by the government does not come under the authority of the Research Division; it is administered by the New York Operations Office which is responsible for the processing of feed materials. This is an analytical laboratory at New Brunswick, New Jersey. Its function is to analyze many of the materials purchased by the AEC from independent suppliers. The purity of such materials, particularly that of source material, is an important factor in determining their acceptability and the amount to be paid for them.

maintains eight major installations in which the land, buildings and equipment are completely owned or leased by the Government and the entire cost of staff and supplies is reimbursed to the university or industrial contractors who operate them.⁴² Four additional research centers are operated by contract at universities with buildings and equipment largely financed by the Commission and with staff and supply expenses wholly reimbursed.⁴³ In addition, the Research Division, through contract, supports the work of individual scientists in industrial laboratories, research institutes, Government agencies and universities. One phase of its activities has been the development of a fellowship program designed to train undergraduate and post-graduate students in various fields of the physical sciences, particularly as they relate to atomic energy.

The Division of Biology and Medicine, separate from the Research Division whose charter has been somewhat narrowed, was established in 1947 to correlate the medical and biological research programs related to atomic energy in both Government and private laboratories. This Division was set up on the recommendation of a Medical Board of Review appointed by the Atomic Energy Commission in June of 1947. The report of the Board called attention to the urgent need for research on the biological effects of radiations and radioactive materials.⁴⁴ This Division has since become one of the most active in the atomic energy program, particularly encouraging research in cancer and the fields of health physics, plant biology, nutrition and, generally, in the use of isotopes for the investigation of life processes in plants and animals. The Division of Biology and Medicine, like the Division of Research, pursues its work by contract with universities, industrial laboratories, government agencies and individual scientists. It also has its own fellowship program.

The Division of Military Application, established in the Act,⁴⁵ directs (a) research on military applications of atomic energy, including atom bombs, rockets, and other carriers, and the use of atomic power for propulsion machinery in naval vessels, military aircraft, etc.; and (b) development and production of military weapons. The Act provides that the Commission may produce atom bombs, bomb parts and other military weapons utilizing fissionable material "except that such activities shall be carried on only to the extent that the express consent and direction of the President of the United States has been obtained, which consent and direction shall be obtained at least once each year."⁴⁶ Each year since passage of the Act the President has fixed the quotas for atomic weapons and fissionable materials, his decision being based

42. SEVENTH SEMI-ANNUAL REPORT 51 (1950), gives the full list of these installations.

43. *Id.* at 51-2.

44. ATOMIC ENERGY COMMISSION, REPORT OF THE MEDICAL BOARD OF REVIEW (1947).

45. Section 2(a) (4) (B).

46. Section 6(a) (2).

on joint recommendations by the Atomic Energy Commission and the Secretary of Defense.⁴⁷

All wartime research on the atom bomb, including direction of the Los Alamos Laboratories, which performed functions closely resembling those that now fall to the Military Application Division, was in charge of Dr. J. Robert Oppenheimer, a civilian. It was taken for granted that the direction of so complex a scientific program lay outside the competence of the professional soldier. Nevertheless, the Act provides that the Military Application Division may be directed by a military man. This provision was not based on logic but arose from the necessity for compromise inherent in the democratic process. The proponents of the thesis that atomic energy is primarily a military weapon fought hard to place soldiers on the Commission itself; when it became evident that they would be defeated on that issue, they insisted the more vigorously that the Military Application Division, at least, should be headed by a military man. And, at some minor sacrifice of logic, they carried their point.

Accordingly, subsection(d) of the organization section sets forth that, notwithstanding provisions of earlier laws, "any active or retired officer of the Army or the Navy may serve as director of the Division of Military Application . . . without prejudice to his commissioned status as such officer."⁴⁸ He receives, in addition to his pay as a member of the armed forces, an amount equal to the difference between that pay and the compensation provided for Division directors.

On his staff are especially qualified representatives of the Army, Navy and Air Force and civilian scientists. Apart from managerial functions, his chief job has been to prepare an outline of the tactical and strategic needs of the armed services, which then becomes the basis for AEC military research and production. At this point it should be noted that the enjoiner prohibiting the Division of Research from extending any support to independent research activities was not applied to the Division of Military Application. Why this precaution should be appropriate in the one case and not in the other is unclear. Presumably it was felt that in view of the strong support given by the Army and Navy to private research on weapons there was little danger of the Military Application Division stifling competition in the field. Because of the secrecy surrounding weapon research both by the Government and private industry, it is impossible to state authoritatively that this expectation has been realized. It is nevertheless safe to say that weapon research, privately or federally conducted, has not languished for lack of funds.

47. David E. Lilienthal, *Hearings before the Joint Committee on Atomic Energy on Investigation into the United States Atomic Energy Project*, 81st Cong., 1st Sess. pt. 20, 797 (1949).

48. Section 2 (d).

Administrative Divisions

Also under the General Manager are four administrative divisions: the Division of Finance, the Division of Public and Technical Information Service, the Division of Security (originally called Security and Intelligence) and the Division of Organization and Personnel. The authority of the divisions of Public and Technical Information Service and of Security is defined below; the functions of the other two divisions are obvious and need no comment.

The Public and Technical Information Service is the Commission's agency for instructing scientists, both those working within the Atomic Energy project and those outside it. Through it, the Commission also issues news of Commission activities, progress, and programs to the general public. In performing these functions, its chief problem has been to reconcile the need for the distribution of technical and lay knowledge concerning the Commission's work with strict Congressional admonitions against the publication of anything that might conceivably be of value to other nations.

The Division of Security performs some of the Commission's most costly and extensive tasks; it assures the physical safety of AEC plants, guards classified information and conducts security and loyalty "clearance" procedures for the Commission's staff and the employees of contractors. It has been estimated that about 20 per cent of the Commission's personnel is occupied in maintaining security.

Also reporting to the General Manager are the Office of the General Counsel, which advises the Commission on matters of law and legal policy and directs all patent activities; the Secretariat of the Commission, and a Program Council, which assists division directors in the overall planning of the Commission's work and rules on the classification and declassification of scientific and technical information. Finally, there is a Director of Intelligence. Originally his duties were combined with those of the Director of Security, but the Commission divided the work in 1948 and the Director of Intelligence is now independent. Almost nothing of his duties has been publicly described, the sole official reference to him being that his task is "to correlate and evaluate information on foreign atomic energy developments," and to maintain "close collaboration with other intelligence agencies of the government."⁴⁹ In 1949, Lilienthal said that the Atomic Energy Commission was not exclusively or primarily responsible for atomic intelligence, pointing out that the Central Intelligence Agency was the arm of the Government created for the express purpose of gathering and evaluating such data. He limited his description of the Commission's own intelligence operations to the statement that there was "liaison with Central Intelligence" and that the Commission was "available for technical information."⁵⁰

The separation of the functions of intelligence and security was the outcome of sharp clashes of opinion between the Commission's first Director

49. FIFTH SEMI-ANNUAL REPORT Foreword (1949).

50. Atomic Energy Commission Release, Press Conference 17, Nov. 24, 1949.

of Security and Intelligence and two of his subordinates. The nature of this dispute has never been disclosed, but as a result of it, the Commission decided to divide the original office on the ground that its two functions were distinct and required separate managers.

III. STATUTORY LIAISON AND ADVISORY COMMITTEES

Military Liaison Committee

The final structure of the Military Liaison Committee is a compromise born out of a bitterly contested struggle. Like most compromises, it is neither scrupulously logical nor entirely satisfactory. The scheme adopted can be fully understood only by a consideration of the proposals it supplanted and the differences it sought to reconcile. The history and the essential elements of this provision are of considerable significance and deserve analysis in some detail.

During most of the period when the War Department's May-Johnson bill for atomic energy control was in the drafting stage the country was at war. Almost all that was known of atomic energy related to its use as a weapon, and after the attack on Hiroshima it was fear, perhaps partly engendered by a sense of guilt, that colored all discussions of the control problem. While it was recognized that atomic energy would, in all probability, have great peacetime uses, the overwhelming weight was placed, then, as now, on security—"keeping the secret"—and on so speeding the development of atomic weapons that the nation might maintain its advantage in time and technical progress. Conceived in a tense, nervous atmosphere and directed toward military objectives, the May-Johnson bill constituted a serious threat to the traditional American principle that the administration of the government shall be in civilian hands.

By a statute passed in 1870, subsequently supplemented and reaffirmed by provisions of other laws, no active officer of the Military Establishment may serve in a civilian post of government.⁵¹ In a specific instance it is possible to remove the disqualification by passing a special law permitting a named member of the armed forces to serve in a post to which the President wishes to appoint him; this procedure has been frequently followed, particularly within the past few years.⁵² The May-Johnson bill, however, authorized the President to appoint members of the armed forces either to the Commission or to its staff, and this in effect was a repeal of the law of 1870, so far as it applied to the AEC. Senate confirmation would still have been required for appointments to the Commission or the post of administrator, but it is evident that, had the May-Johnson bill been adopted, the Senate would hardly

51. 10 U.S.C. § 576 (1940).

52. For example, special legislation was passed in 1950 to permit General George C. Marshall to serve as Secretary of Defense, a post specifically barred to military men. See Pub. L. No. 788, 81st Cong., 2d Sess. (Sept. 18, 1950).

have undertaken to reject a Presidential appointment on the sole ground that the appointee was an officer of the armed forces. Thus, even though the May-Johnson bill made military appointments permissive rather than mandatory, it embodied a principle at fundamental variance with the traditional nature of our system.

The brief for military membership rested on the major premise that the military departments of the government have a *primary* responsibility for the national defense. The premise is false, for the Constitution gives Congress the sole power "to provide for the common defense"; "to raise and support armies . . ."; and "to provide and maintain a Navy"; the President is responsible for the conduct of foreign relations (which, in the first instance, determines national defense requirements) and is Commander-in-Chief of the Army and the Navy. What the Defense Department has is a *delegated* responsibility, traditionally confined to the training, maintenance, and deployment of the armed forces in accordance with the directives of the President. Matters of policy affecting the broad national interest lie wholly outside the scope of authority of the military departments. Even issues of organization entirely within the Army, Navy or Air Force are decided by the President, unless authority to arbitrate them has been conferred specifically by Congress. During the last war, Congress issued to the Army and the Navy numerous broad grants of power; nonetheless, in the exercise of a function so vital to the military effort as that of procurement, the service departments were required to apply for allocations of men and materials to such civilian agencies as the Selective Service System and the War Production Board. The Army and the Navy came as claimants and petitioners and, however much their claims and petitions were favored, they were not empowered to fix their own allocations or determine their own priorities.

The bill (S.1717) introduced by Senator McMahon on December 20, 1945, which, after some revision, became the Atomic Energy Act of 1946, differed from the May-Johnson bill so far as the personnel of the Commission was concerned in providing for full-time, all-civilian membership. The statutory technique consisted simply of omitting the exemption for members of the armed forces contained in the May-Johnson bill, thus leaving in effect the prohibition of the law of 1870. To be sure, the President is free to appoint a military man to the Commission if he considers him uniquely qualified. But in that case he is required, as in making appointments to other civilian posts, to request a special act of Congress.

The basic difference between the two approaches lies in this: Under the May-Johnson bill, the President would have been justified in making military appointments to the Commission as a matter of course; under the Atomic Energy Act, traditional policies remain in force; separate legislation is required for every military appointment, and only *special* circumstances or unique qualifications on the part of the appointee would justify the choice of an officer.

The conflict between the proponents of these opposing measures was sharp and bitter. A compromise was obviously called for, and Senator Vandenberg, the most influential member of the Senate Special Committee, undertook to draft one. His task was to preserve the essentials of civilian control while making absolutely sure that the military departments would have all the information and authority that the most pronounced distrust of the international situation and the strongest concern for security and military preparedness could dictate. To accomplish these objectives he submitted a proposal which immediately became known as the Vandenberg amendment.

In its original version, this amendment, providing for the establishment of a Military Liaison Committee composed of representatives of the War and Navy Departments, conferred such broad powers on the Committee that it was commonly regarded as more dangerous to the principle of civilian control than the May-Johnson bill itself. The members of the Military Liaison Committee were to have the power to inform themselves of *every decision* and *every action* of the Atomic Energy Commission. If "any action, proposed action, or failure to act" on the part of the Commission was deemed unsatisfactory by the Committee, it was authorized to make its own recommendations. If the Commission did not adopt them, the Committee could appeal *directly to the President*. In effect, the Committee would become the monitor of all Commission activities. Whenever its judgment on policy differed from the Commission's, it could appeal the matter to the President directly and over the heads of the Secretaries of War and Navy. Not even the Attorney General was to be consulted on the scope of statutory military responsibility, which in theory at least underlay the Committee's powers. The President alone could frustrate the Committee's will and even he could not define or restrict its activities.

Under the stimulus of a tempestuous public reaction to this measure, Senator Vandenberg was prompted to reexamine the entire issue. After consulting with numerous high military officials and scientists and with his colleagues on the Senate Committee, he proposed certain substantial modifications of his original amendment. These, in turn, were discussed at length, debated, and several times rewritten in Committee before the present version emerged. The section as unanimously adopted by the Senate Committee is not altogether felicitous in phrasing nor clear in intent; it completely satisfied no one and left many seriously disturbed. "The difference between the right word and the almost right," said Mark Twain, "is the difference between lightning and the lightning bug." Here the lightning bug is in evidence.

The Military Liaison Committee, designated by the Secretaries of the three Armed Services (after 1947, by the Secretary of Defense), consults with the Commission on all *activities relating to the military application of atomic energy*. These include the development, manufacture, uses, and storage of bombs, the allocation of fissionable material for military research, and the control of information relating to the manufacture or utilization of atomic

weapons. The decision as to whether individual matters fall under any of these headings rests with the Committee.

The *Committee* must keep the *Commission* informed of all atomic energy activities undertaken by the armed services. These activities would include the development and testing of weapons, tactical plans for their use, and the like. This provision is indispensable; for unless the Commission has full knowledge of the activities of other government departments in the field of atomic energy it cannot be expected to exercise its control and coordinating functions properly.

Section 2 (c) further provides that the Committee may make recommendations to the Commission in areas affecting the responsibility of the armed services; if these are not acted upon and the Committee believes the welfare of the armed services to be seriously jeopardized, the Act provided originally that the Committee might turn its recommendations or protests over to the Secretaries of War or Navy. "If either Secretary concurs, he may refer the matter to the President, whose decision shall be final." Now, of course, such disagreements are submitted to the Secretary of Defense.⁵³ Thus the principle was laid down that the Military Liaison Committee must channel its recommendations through the civilian head of the military departments and cannot deal directly with the President.

Comparing the original Vandenberg amendment with the provision adopted by Congress, it might appear that the essential elements of the earlier version escaped significant modification and that public protest was quelled with only a token concession. Such is not the case, however; the compromise was a genuine one. The concessions in the direction of limiting the power of the military may be listed as follows:

1. Defining by illustration the scope of the term "military applications," the section imposes limitations on the area in which the Military Liaison Committee may operate, even though the boundaries are not precise.

2. There is a reciprocal responsibility on the part of the Committee and the Commission, each to keep the other informed of all atomic energy activities within the province of its own special knowledge.

3. The Committee's extraordinary authority to appeal directly to the President is eliminated.

53. This section was amended in 1949 to conform with the Armed Services Unification Act passed by the Eightieth Congress in July of 1947. Members of the Liaison Committee are now designated by the Army, Navy and Air Force Secretaries, but must channel any complaints that they may have to the President through the Secretary of Defense. In effect this gives the Liaison Committee only one avenue to the President instead of the two—the Secretaries of War and the Navy—it had before unification took place. See 63 STAT. 762 (1949).

4. Appeals to the President for alteration of the Commission's policy can be made only through the Secretary of Defense. As the President's principal lieutenant in the field of defense, it is both appropriate and desirable that he be informed of such problems arising within the Commission as relate to his responsibility. Even if there were no Military Liaison Committee, the Secretary of Defense would, as a matter of course, consult with the President regarding the policies of the Commission. Under the procedure established by the Act, many atomic energy matters can be decided between the Secretary of Defense and the Commission without burdening the President. Thus, the Military Liaison Committee performs the useful function of keeping the President's principal representative in the military department informed of the activities of the AEC relating to national defense.

The Military Liaison Committee has its offices in the building occupied by the Commission in Washington and its staff is in constant touch with that of the Commission. Almost all Commission business is made known to the Committee through staff papers and staff conversations. When differences are not resolved at the staff level, they are referred to the higher authority in each body. During the first year, there were joint Commission-Committee meetings every two weeks. Gradually these formal meetings were cut to one a month and in 1949, at the suggestion of the Military Liaison Committee, joint sessions were called only when specific problems were to be discussed.

From all surface appearances, it seems that relations between the Military Liaison Committee and the Commission are satisfactory, and evidence of harmony can be found in the support that the Atomic Energy Commission received from the Department of Defense and the Military Liaison Committee during Congressional attacks on the Commission in 1949 and on other occasions.⁵⁴

54. See statement in the FIRST REPORT OF THE SECRETARY OF DEFENSE (then James V. Forrestal) 1948, p. 16, reading:

"I want to record my personal satisfaction with the existing statute governing matters in the field of atomic energy, and to express my pleasure, also, at the way in which relationships between the National Military Establishment and the Atomic Energy Commission are being conducted."

And see a letter to Chairman Lilienthal from the Commander of the Joint Task Force of Operation Sandstone which conducted tests of atomic weapons at the Commission's proving grounds at Eniwetok in April and May of 1948. The letter read, in part:

"The support we received from everyone in this operation, and particularly the Atomic Energy Commission, left nothing to be desired."

(The text of these exchanges will be found in *Appendices to Hearings before the Joint Committee on Atomic Energy on Investigation into the United States Atomic Energy Project*, 81st Cong., 1st Sess. pt. 23, 944-6 (1949).

Again, when Congress sharply criticized the Commission's Fifth Semiannual Report on the ground that it disclosed information that should have been kept secret, the Chairman of the Military Liaison Committee wrote Lilienthal to confirm the fact that the Committee had discussed all sections of the Report with the Commission and had found that it "contained no material objectionable on the grounds of military security." *Hear-*

There is, as a matter of fact, no reason to suppose that the Military Liaison Committee, at least, has had much ground for dissatisfaction.⁵⁵ At the time of his confirmation hearings in 1947, and when pressed by certain members of the Senate Section of the Joint Committee, Lilienthal gave assurance that it would be the Commission's policy "to regard virtually everything as having some consequence in military operations." He thus opened the way to military surveillance of all the Commission's activities.

From time to time there have, to be sure, been differences of opinion, an important instance being the sharply opposed views of the Commission and the Committee on the custody of atomic bombs. The question was debated for several months, but Lilienthal in 1949 denied that these "discussions" could be described by so strong a word as "argument."⁵⁶ Whatever heat was generated by the Commission and the Military Liaison Committee on the matter of custody seems not to have permanently affected relations between the Commission and the higher officers of the Military Establishment.

There is reason to suppose, however, that bitter struggles among the military services themselves have been reflected within the Military Liaison Committee. If inter-service rivalries become acute, as they have on occasion during the past few years, the Atomic Energy Commission might be caught between the conflicting positions of members of the Military Liaison Committee. To understand this, it must be realized that the term "liaison" is a euphemism. The members of the Committee are there as claimants for and advocates of their particular services and so, while in theory representatives of the joint Military Establishment, must inevitably seek to defend the interests of their particular branches of the service. To the extent that there is

ings before the Joint Committee on Atomic Energy on Atomic Energy Report to Congress, 81st Cong., 1st Sess. 19-20 (1949).

A statement by the Chairman of the Joint Committee also tends to confirm the point. Statement of Senator Brien McMahon, *Hearings before the Joint Committee on Atomic Energy on Investigation into the United States Atomic Energy Project*, 81st Cong., 1st Sess. pt. 6, 262 (1949).

55. But there was some evidence of friction during the first year. In his diary, Defense Secretary Forrestal reported a visit on January 22, 1947, from Senator Bourke B. Hickenlooper, then chairman of the Senate-House Joint Committee on Atomic Energy, to express concern over "a growing disinclination" on the part of the AEC to "communicate with the Military Liaison Committee which was specified in the organic act dealing with atomic energy. Admiral Parsons [member of the M.L.C.] participated in the conversation and expressed the view that some of the attitude which Senator Hickenlooper was concerned about came from the realization by Lilienthal and his associates of the tremendous power and responsibility which had been put upon his, Lilienthal's committee. . . . The general tenor of Senator Hickenlooper's remarks would lead to the conclusion that he and his Senate associates are very much concerned about a pacific and unrealistic trend in the Atomic Energy Commission." MILLIS & DUFFIELD, *THE FORRESTAL DIARIES* 240 (1951).

56. *Hearings before the Joint Committee on Atomic Energy on Investigation into the United States Atomic Energy Project*, 81st Cong., 1st Sess. pt. 9, 419 (1949). And see note 18 *supra*.

rivalry among the services, their advocacy becomes sharpened and their demands can become mutually contradictory.

An example of this sort of partisanship is to be seen in the reliable reports that at least one member of the Committee, a representative of the most aggressive of the armed services, engaged in a cabal against the Commission and particularly against Lilienthal in 1949. In addition, strong intimations were made at a hearing of the Joint Atomic Energy Committee in the same year that an article denouncing Lilienthal's policies as Chairman of the Commission might have originated in the Air Force. It was further hinted that there had "been some violation of security" in furnishing information to the writer of the article, and that the leaks were from official sources.⁵⁷ Lilienthal himself told the Committee that violation of security appeared to be involved and that the Commission would conduct an investigation.⁵⁸ If one was made, there has been no public disclosure of its findings.

The organizational history of the Military Liaison Committee itself reflects inter-service competition. The first chairman of the Committee was an Army officer who had spent most of his military life in the Army Air Force.⁵⁹ He became Chairman of the Military Liaison Committee, presumably by reason of senior rank. A few months later, when the armed forces were unified, he automatically became a member of the autonomous Air Force, thus bringing the Chairmanship of the Military Liaison Committee into the hands of the youngest of the services. It is not known that this situation produced friction, but in June, 1948, and before he had served a year as Chairman, this officer was returned to active duty. James V. Forrestal, then Secretary of Defense, appointed a civilian chairman in his stead.⁶⁰ Forrestal did not comment on this aspect of the appointment, but there is reason to believe that his decision was prompted by an acrimonious dispute between the Army, Navy and Air Force as to the most efficient methods of using nuclear weapons. Appointment of the civilian chairman was made informally, since there was nothing in the Act to prescribe the organization of the Military Liaison Committee or dictate how the chairman should be selected. The new arrangement appeared to work well, however, and when the Act was amended in October, 1949, to make the section dealing with the Military Liaison Committee conform with the statute on unification of the armed services, Congress provided formally for an appointive chairman. But, instead of permitting the Secretary of Defense to make the appointment, the new legislation stipulated that the

57. *Id.* at 417, statement of Congressman Price of Illinois. Lilienthal stated that the articles discussed at least two of "perhaps the most highly classified and important pieces of information from the point of view of a potential enemy of this country," *i.e.*, the power of atomic weapons and the size of the stockpile. *Id.* at 413-21.

58. *Id.* at 418.

59. Lt. Gen. Lewis H. Brereton, United States Air Force.

60. William Webster, Deputy Secretary of Defense for Atomic Energy. He served as Secretary Forrestal's personal representative.

appointee be named by the President subject to confirmation by the Senate.⁶¹ On the insistence of Republican members of the Joint Committee, the amendment was so framed that membership in the armed services was no bar to the chairman's post. The last two incumbents have been civilians, President Truman having made the second appointment.⁶²

While the reasons for thus providing for the chairmanship of the Military Advisory Committee have been obscured in generalities (the Joint Committee, for instance, recommended the change on the ground that the post was "of great importance") there can be little doubt that the principle of civilian chairmanship, thus far followed by the Administration, is good. Rivalries can be dealt with impartially and inter-service manipulations for the chairmanship are eliminated. The new system, if it becomes ordained by custom, would then have corrected the Act's failure to provide clearly for the leadership of the Military Liaison Committee; it is a procedure that should benefit both the Atomic Energy Commission and the Military Establishment.

General Advisory Committee

Despite its admitted drawbacks, the Commission form of organization was adopted on the ground that, in formulating policies and programs in a new and experimental field, diversity of judgment and experience would be needed in the control unit. Congress was convinced that best results would be obtained from a full-time civilian commission, not dominated by scientists or men of technical experience. At the same time, it was influenced by two other suppositions: First, that it would be difficult to obtain for the operating divisions the full-time services of certain outstanding scientists and technicians who had well-established positions in universities or industry; and, second, that technical advice from these men as well as from other sources outside the government would be invaluable not only to the Commission but to the divisions. These considerations led Congress to establish a General Advisory Committee, composed of civilians to be appointed by the President, to consult with the Commission at least four times a year on scientific and technical matters relating to materials, production, research and development.

The Committee named by the President includes such distinguished scientists in the atomic energy field as Dr. J. Robert Oppenheimer, Director of the Institute for Advanced Study at Princeton; Dr. Enrico Fermi of the Institute for Nuclear Studies at the University of Chicago, and Dr. Lee A. DuBridge of the California Institute of Technology. The Committee is in the habit of convening for two or three days every two months.

61. 63 STAT. 762 (1949).

62. Robert LeBaron, industrial chemist, was appointed Chairman of the Military Liaison Committee by Secretary of Defense Louis Johnson on October 1, 1949. On passage of the amendment regulating the method of appointment of the Chairman (see above) LeBaron was officially nominated by President Truman and was confirmed by the Senate on October 19, 1949. There were no public hearings, the Senate section of the Joint Committee approving the nomination in executive session.

The General Advisory Committee has proved to be a useful body. Its membership has added prestige to such decisions of the Commission as have been taken under its advice. It has helped to concentrate the views of the scientific community and to give it a voice in the shaping of Commission policies. It has advised the Commission on many problems, but has not been content merely to give advice. Instead, it has performed such real work as the preparation of reports on the possible industrial uses of atomic energy and the wisdom of establishing a fellowship program; it has appraised the Commission's weapons program and offered a code of regulations for the distribution of isotopes abroad.

The General Advisory Committee has also been a valuable political ally. It has on the whole given powerful support to the Atomic Energy Commission, and on scientific matters, has frequently appeared as a successful Commission advocate before the Joint Congressional Committee. For obvious reasons, it has been less effective in areas permeated by ignorance and prejudice, but it has proved relatively impervious to Congressional pressures and has frequently spoken up in behalf of Commission policies when they were under fire.

The fears expressed by some framers of the Atomic Energy Act that the General Advisory Committee might run the Commission have not been justified. On the contrary, it could be held that the Committee's voice should command greater respect, that in certain areas, especially those pertaining to secrecy and the dissemination of information, its views should prevail. While Commission policies have generally coincided with those of the Advisory Committee, and while the latter's opinions unquestionably exert influence, the Commission has shown itself "a little bit more conservative," as the Committee's Chairman put it,⁶³ than its panel of scientific advisers.

Other Advisory Committees

The Commission has the general authority to establish its own advisory boards on such matters as legislation, labor policies, administration, research and other matters. It has exercised this authority to an extraordinary degree for substantive as well as tactical reasons: on the one hand sincerely seeking expert advice, and on the other hand arming itself with prestige against its critics. Even a cursory examination of its register of advisory committees, boards and panels indicates the wide diversity of problems on which the Commission has enlisted outside help. Among the groups are a committee on biology and medicine, concerned particularly with research and health; a chemistry committee, interested in Commission support of basic unclassified chemical research in universities; a board to hear appeals arising

63. A description of the relations between the Atomic Energy Commission and the General Advisory Committee will be found in *Hearings before the Joint Committee on Atomic Energy on Investigation into the United States Atomic Energy Project*, 81st Cong., 1st Sess. pt. 7, 293-8 (1949).

out of possible disputes over contracts and subcontracts; a committee to assure harmony between the Commission and the electric power industry; a committee to advise the Commission on export controls for industrial equipment to be used in some phase of nuclear technology; a committee to study engineering problems arising in the Commission's reactor program; a legal panel to counsel the Commission on patents and inventions; a personnel management committee to oversee the Commission's employee relationships; a review board to examine personnel security cases and to advise on the standards which determine eligibility for security clearance; a committee on raw materials to offer guidance on exploration, mining and procurement of source materials; a committee to counsel the Commission on hazards in the operation of reactors and to suggest safety measures; a group to suggest methods for disposing of radio-active gaseous waste from Commission installations; and a panel (representing major AEC contractors) to recommend improvements in the Commission's technical information service.

A few committees and boards—the Medical Board of Review, the Committee on Scientific Personnel, the Advisory Committee for Equipment and Material Control, among them—were set up for specific problems and disbanded when their work was completed. Others, the Advisory Committee on Chemistry is an example, rarely hold formal meetings but do most of their work by the consultation of individual members with various divisions of the Commission. There are groups which, like the Advisory Committee for Equipment and Material Control, may meet only once a year; others with responsibilities as pressing as the Advisory Committee on Personnel Management convene as often as once a month. All in all, the Commission's permanent and temporary advisory bodies have concerned themselves with an impressive cross-section of the Commission's work.

In many respects, the advisory committee technique has turned out to be as shrewd as it is useful. The prestige enjoyed by these bodies among Congressmen (the Commission has picked predominantly conservative teams of experts) has to a real degree protected the Commission from criticism. Thus the highly respectable membership of the Commission's first Personnel Security Review Board was of great assistance when the Commission was attacked in 1949 for allegedly administering its security program loosely and inefficiently.⁶⁴ On the other hand, the Commission's attempt in 1949 to justify its security policy on fellowships by invoking the prestige of its Fellowship Boards failed disastrously, for Congress insisted finally on FBI investigations of all fellowship holders.⁶⁵

64. Members of the original Board were Owen J. Roberts, former Associate Justice of the United States Supreme Court, Chairman; Dr. Karl T. Compton, President, Massachusetts Institute of Technology; Hon. Joseph C. Grew, diplomat and former Under Secretary of State; George M. Humphrey, President, M. A. Hanna Co.; and H. W. Prentis, Jr., President, Armstrong Cork Co.

65. The Fellowship Boards were made up of university professors whose persuasive powers with the Joint Committee were not as strong as those of business executives and the scientists suffered a severe reverse in this dispute.

But for all its varied usefulness, the advisory committee system has disadvantages. Committee members often represent such private interest groups as mining, the electrical industry, and patent directors for private industry, whose objectives do not necessarily coincide with public interest. Here, too, may develop an advocacy of special interests closely analagous to the rival ambitions competing within the Military Liaison Committee. This consideration is the more important because the Commission can easily find itself seriously embarrassed if it disregards the advice of its advisers, even when such advice is inconsistent with established policies.⁶⁶

SECTION TWO: BASES OF POLICY FOR THE PRODUCTION OF FISSIONABLE MATERIAL

I. THE PHYSICAL PLANT

The production of fissionable material, mainly U-235 and plutonium, and the construction of the weapons for which these substances are the charge,

66. It should be noted however that in at least one important activity, that of spreading technical information, the advice of one of the Commission's panels, *i.e.*, the Industrial Advisory Group, was far more enlightened than the practices of the Commission. Yet the latter chose to disregard this advice at the time, presumably because of its fear of Congress and perhaps also because the report unmistakably reflected on Commission policies. Although the report of the Industrial Advisory Group was made December 15, 1948, it was not made public until December 30 and was then overshadowed by the simultaneous announcement by the Commission that E. I. du Pont de Nemours and Company and the Westinghouse Electric Corporation were coming "into key parts of the program." With the industrial group's report the Commission issued an answer to some of the specific criticism that had been made. (At a press conference the day before the report was released, James W. Parker, president and general manager of the Detroit Edison Company and chairman of the Group, went out of his way to say that the report was not "to be considered a criticism" of what the Commission had been doing. But this was more magnanimous than accurate.) Among suggestions made by the Advisory Group were: greatly expanded industrial participation in the atomic energy complex; publications of a "vast amount of non-secret information of potential value to industry," which lay "buried in the files and activities of the Commission"; opening of atomic installations (with proper safeguards) for study by engineers and technical executives; creation of a permanent General Industrial Advisory Committee. There was also disapprobation of the Commission's geographically decentralized organization. Lilienthal, while stating that the Group's suggested changes were "highly desirable" in principle, questioned the practicality of some and raised the point that security considerations might bar the adoption of others. Six months later the Commission appointed an Ad Hoc Committee on Technological Information for Industry whose task was to examine the Commission's technological files and processes "with a view to recommending material which should be submitted for declassification." It is not certain that the appointment of this Committee was a result of the criticisms expressed in the Report of the Industrial Advisory Group. If it was, it was the only recommendation of the Report on which action was taken. (See INDUSTRIAL ADVISORY GROUP, *op. cit. supra*, note 25, and Chairman Lilienthal's letter acknowledging the report, December 28, 1948. A somewhat condensed version of the Report and the full text of Lilienthal's reply will be found in the Bulletin of the Atomic Scientists for February, 1949. Also see Press Conference, Atomic Energy Commission, December 29, 1948.)

constitute the principal manufacturing activities of the AEC. The operations are complex and require huge specialized industrial plants. For reasons of safety and security, these plants have been located in comparatively remote and isolated regions; therefore it has been necessary to construct for each major fabricating complex a separate community to house, with their families, thousands of scientists, engineers, technicians, laborers and management employees. There is little resembling self-government in these communities. They are managed by private concerns on cost-plus fixed fee contracts. Municipal functions of maintenance, police, fire-fighting and the like are performed by management contractors. There are no elected officials with normal municipal authority, though a Town Council elected by residents acts in an advisory capacity to city officials, all of whom are Commission employees. It is in such surroundings that employees of AEC production plants live and work.⁶⁷

Oak Ridge, Tennessee, is the Commission's center for the separation of the isotope U-235; Hanford, Washington, is the site for the great piles where plutonium is made; at Los Alamos, New Mexico, is conducted the bulk of research and development for nuclear weapons. A brief description of these centers and of the Savannah and Paducah plants is an appropriate preface to a consideration of the contract and labor policy aspects of AEC production discussed in this section.

Oak Ridge

The separation of the fissionable isotope U-235 from the more abundant U-238, with which it is found in nature, depends upon the use of manufacturing processes based on the small difference in atomic mass. Other methods are

67. Although little can be said about it in this article, community management has provided the Commission with some of its most trying difficulties. The towns are obviously a minute part of the whole atomic enterprise, but they have been the focus for a large amount of Congressional attention.

There are special reasons for this. In the first place, the plea of security does not operate very effectively in this area and the legislators, often frustrated in their attempts to get at the details of plants and operations, have seized upon the economics of community management. In the second place, Congressmen, who may easily become lost in discussions of nuclear physics, have no difficulty in grasping the implications of a company town. They are alarmed by the sovereign power which the AEC, through its contractors, wields over the residents and small business of Oak Ridge, Richland and Los Alamos. One of them, Senator Millikin, went so far as to declare that the Commission had a "perfect pattern . . . for fascistic control over business. . . ." *Hearings before the Joint Committee on Atomic Energy on Investigation into the United States Atomic Energy Commission*, 81st Cong., 1st Sess. pt. 13, 571 (1949).

Thus far, the Commission has been able to make at least a case for its community policies. Both the waste and the control exist, but they are to a degree justified on the double grounds of urgency and security, neither of which is a condition of the Commission's making. Nevertheless, no one today knows how, or by whom, the atomic energy business will be developed in the future, and Congress does no more than its duty when it notes as sharply as possible that the towns to date are models of neither frugal domestic management nor democratic citizenship. See notes 76, 83, 86 *infra*.

unavailing, since both substances are isotopes of uranium and do not differ in chemical properties.

"To take advantage of this slight weight difference between an atom of U-235 and an atom of U-238, the Manhattan Engineer District built an aggregation of plants costing almost \$800,000,000, together with the supporting city of Oak Ridge which at the peak of construction activity, had a population of 75,000—third largest in Tennessee. There were three large plants. Each made use in a different way of the slight variance in weight. The *thermal diffusion* process used tremendous quantities of heat to bring about a separation of U-235 and U-238. This process proved less efficient than the other two, and the plant has now (1949) been dismantled. The *electromagnetic separation* process whirled uranium atoms in large semicircular arcs in a magnetic field. The atoms of U-235 followed a slightly different course from that followed by the heavier U-238 atoms. Thus it was possible to collect U-235 and U-238 at different points at the end of the arc."⁶⁸ For various technical reasons electromagnetic separation cannot compete in terms of manpower requirements and power consumption with alternative methods. The Y-12 plant has therefore been put in stand-by status⁶⁹ and at Oak Ridge today it is the *gaseous diffusion* process that accounts for most of the U-235 produced by the Commission.

Gaseous diffusion makes use of a fact discovered by Lord Rayleigh in 1896 "that a mixture of two gases of different atomic weight could be partly separated by allowing some of it to diffuse through a porous barrier into an evacuated space. Because of their higher average speed the molecules of the light gas diffuse through the barrier faster so that the gas which has passed through the barrier (i.e., the 'diffusate') is enriched in the lighter constituent and the residual gas which has not passed through the barrier is impoverished in the lighter constituent."⁷⁰ The gaseous diffusion plant, at Oak Ridge⁷¹ is a system of thousands of such barriers through which a gaseous compound of uranium, uranium hexafluoride (UF_6) is cycled and recycled until it reaches a certain state of enrichment in the U-235 isotope.⁷² Thousands of

68. FIFTH SEMI-ANNUAL REPORT 13 (1949).

69. *Id.* at 14.

70. SMYTH, A GENERAL ACCOUNT OF THE DEVELOPMENT OF METHODS OF USING ATOMIC ENERGY FOR MILITARY PURPOSES 158 (1945). See also FIFTH SEMI-ANNUAL REPORT 14 *et seq.* (1949) for a description of gaseous diffusion.

71. The K-27, K-29 and K-31, additions to the K-25 gaseous diffusion plant, must not be thought of as parallel and separate plants but as expansions of K-25 and an integral part of it. Gaseous diffusion is a "cascade process." The unenriched UF_6 gas is fed in at the "highest" stage; as it moves through the barriers, that portion of the gas enriched in U-235 is kept on its course, while portions of the gas impoverished in U-235 are "skimmed off." What this means is (1) that the U-235 goes all through the plant, (2) that the successive stages of the cascade handle smaller and smaller quantities of richer and richer gas.

72. FIFTH SEMI-ANNUAL REPORT 15 (1949). "To get one pound of final product, 100,000 pounds of uranium hexafluoride had to be put through the first stage." SACKS, THE ATOM AT WORK 294 (1951).

miles of pipe, thousands of pumps and motors, and myriads of intricate electrical and electronic mechanisms are needed for control of the whole complex process. Because uranium hexafluoride is intensely corrosive, the entire system must be leak proof and corrosion proof. K-25 is the largest continuous process plant in the world under a single roof—a 60 acre roof. The plant is approximately one mile long, a twelfth of a mile wide, four stories high and U-shaped. K-27, a companion process building, is approximately one-fourth as large. The accompanying steam plant is the largest plant of its kind ever constructed at one time. All told, auxiliary structures number more than 70 and the plant occupies an area of 600 acres.⁷³

The Oak Ridge Area covers approximately 92 square miles of government-owned land.⁷⁴ In it are situated, among others, the gaseous diffusion and electromagnetic separation plants; the Oak Ridge Institute of Nuclear Studies, Inc. (an organization of 24 member universities of the South and Southwest); the Oak Ridge National Laboratory, nuclear research center and production unit for radioisotopes;⁷⁵ and the community of Oak Ridge with a population in 1951 of approximately 32,000. The area is also headquarters for the Research Project for the Application of Nuclear Energy to the Propulsion of Aircraft (NEPA), a combined operation of several aircraft companies, the National Advisory Committee on Aeronautics, the Air Force, Navy and AEC.⁷⁶

73. FIFTH SEMI-ANNUAL REPORT 15 (1949). It should be noted that these data as to size, auxiliary structures and the like, do not reflect the K-29 and K-31 expansions.

74. For a reliable document on Oak Ridge—freely used in this discussion—see ATOMIC ENERGY COMMISSION, BASIC FACTS ON THE OAK RIDGE AREA OF THE U.S. ATOMIC ENERGY COMMISSION AND THE COMMUNITY OF OAK RIDGE (1949). Also ROBINSON, THE OAK RIDGE STORY (1950).

75. This pile served during the war “as a pilot plant for the construction of the huge plutonium process buildings at Hanford. . . .”

76. The Oak Ridge site was chosen in September of 1942 by representatives of the Manhattan District, established only a month earlier. “The site was selected for these reasons: it had to be isolated from large centers of large population, large enough to accommodate several huge plants to be built in flat building areas separated by natural barriers, with dependable electrical power in large quantities [TVA]; it had to be near a large body of water and accessible to rail and motor transport.” Although the population of the site area was relatively sparse, the new construction required the moving of 3000 persons out of about 1000 homes, and the near-elimination of the three small farming communities of Scarboro, Robertsville and Wheat.

The city of Oak Ridge was built from scratch by the Government (through private contractors) in two and a half years beginning early in 1943; and at a construction cost of approximately \$96,000,000. Although the building of the city began with the building of the plants, construction of the latter advanced more rapidly. Living quarters of some kind had to be provided and the nearest sizable community, Knoxville, was 18 miles away: in the circumstances, it is not surprising that the wartime city was pretty much a makeshift and temporary affair. “At the peak of operations 4000 trailers, 16,000 hutment and barracks spaces, 9,600 houses (semi-permanent types and flat-tops) and 90 dormitories had been built and were occupied.” These accommodations were one source of the numerous social, economic and political problems of community life.

Hanford and Richland

"The men who developed nuclear fission and demonstrated the first nuclear chain reaction in the experimental uranium and graphite pile (reactor)⁷⁷ at Chicago had reason to believe that nuclear reactors, if large enough, would produce usable amounts of plutonium. And they knew that any such plutonium would be chemically separable from the parent uranium, since it was a different chemical element. They built a pilot plant at Oak Ridge to try out the whole idea, both the transmutation and the chemical separation. Even before the process had proved workable, the E. I. du Pont de Nemours and Co. Inc. began to build Hanford."⁷⁸

An atomic pile, in simple terms, is a great block of graphite pierced at intervals by tubes that run from one side of the pile to the other, the tubes being filled by metal jacketed uranium slugs. Under suitable conditions nuclear interactions, accompanied by heat and radiation, will take place in the pile and a portion of the uranium will by neutron bombardment be transmitted into plutonium. The active principle of the pile, as of the bomb, is the nuclear

Much has been done since the war to transform the city of Oak Ridge into a permanent and livable community. The trailers, hutments and barracks are gone, a number of schools have been built, the town has modern fire and police departments and a large hospital. Approximately 200 businesses cater to the needs of Oak Ridge residents, among them theatres and other recreational facilities; there are almost 200 miles of streets and roads, transit facilities, and all other normal public services.

Pursuant to uniform Commission policies, the city is wholly managed by a private concern, the Roane-Anderson Co. of N.Y. The various businesses operate under concession arrangements with the management contractor, subject to the approval of the Office of Community Affairs of the AEC. The contractor has a cost-plus-fixed fee contract with the Commission. Municipal functions of maintenance, police, fire-fighting and the like are performed by Roane-Anderson. There are no elected officials with normal municipal authority, although a seven-member Town Council elected by the residents acts in an advisory capacity to the city officials, all of whom are Commission employees.

Until March, 1949, Oak Ridge, including the town, was a "closed area" but at that time the community itself was opened to the general public. Various plans have been considered to give Oak Ridge greater autonomy, to make it, as much as possible, "a normal city comparable to the average American community of the same size." Proposals have been entertained for incorporating the city, but this has not yet (1951) been done. To give some elements of stability to the city's economic life, business establishments are now being granted long-term leases. All the land within the area, with the exception of a small acreage sold to churches and to the State of Tennessee for a National Guard Armory, is owned by the Federal Government; here again, there has been some talk of selling plots for private homes. Oak Ridge inhabitants are, for voting and all other legal purposes, under the jurisdiction of Tennessee. See ATOMIC ENERGY COMMISSION, *op. cit. supra* note 74.

77. "At first, all nuclear reactors were called 'piles' because they were actually piles of uranium and graphite. The term is still correctly applied to this type of reactor, but 'nuclear reactor' is now generally used to mean all types of self-sustaining nuclear chain-reacting assemblies." FIFTH SEMIANNUAL REPORT 22 (1949).

78. *Id.* at 24.

chain reaction. In the pile the reaction is controlled and "slow"; in the bomb it is purposely uncontrolled and "fast."

There are several points to keep in mind about the production of plutonium. The operations involved are complex, difficult, uncommonly hazardous and require, if substantial quantities of plutonium are desired, immense installations. From start to finish, from the moment the pile is activated until the plutonium is separated from the uranium slugs, the materials dealt with give off deadly radiations that require massive shielding, and many steps in the production sequence must be performed by remote control. In the making of plutonium nothing is easy. Both the graphite and the uranium must be exceptionally pure, for impurities rapidly absorb neutrons and cause the chain reaction to run down. A nuclear reactor, however pure the ingredients, has a tendency to deteriorate by "self-poisoning"; yet it cannot be taken apart for repairs and extraordinary maintenance precautions must therefore be exercised to prolong its usefulness. The operation of a pile requires great quantities of fresh water for cooling; power facilities of large capacity are also needed.

In the southeastern portion of the state of Washington there is a remote Government area of 620 square miles lying mainly within a fork formed by the junction of the Columbia and Yakima rivers. During the war there was built here the Hanford Engineer Works, consisting of "three reactors and the necessary chemical separation plants, together with a multitude of supporting facilities, including the plants for canning uranium slugs in aluminum before they are fed into the reactor, and the community of Richland to house the plant operators. The reactors were isolated and widely separated from one another in the Hanford reservation, which comprises some 400,000 acres—more than half the area of Rhode Island. The water of the adjacent Columbia River diverted to cool the reactors would equal the water consumption of a city of over a million inhabitants. The temporary construction camp housed 60,000 people, and the reservation town of Richland 15,000. Cost of the project was nearly \$350,000,000."⁷⁹

Ground was broken for the Hanford works in March, 1943, and the first pile was in operation in September, 1944. The single objective of the Hanford builders was to construct a plant which would turn out plutonium for bombs, and to construct it with all possible speed. This was accomplished successfully, but not without some sacrifices. The piles and the separation plants, for all their costliness, reflected the fact that "there was no time for full evaluation of design features."⁸⁰ Though still in operation today, the piles were so deteriorated when taken over by the AEC in 1947 that huge expenditures were required for a major overhaul and reconditioning program to forestall collapse of the entire project. "In the original design of the separation plants, there was no plan to provide for recovering the unused uranium. Laboratories,

79. *Ibid.*

80. *Ibid.*

offices, shops, stores and living quarters were designed to satisfy minimum needs and no more."⁸¹ Besides undertaking the reconditioning program, the AEC has spent large sums at Hanford to build additional piles,⁸² to add new separation plants and enlarge those already existing, to provide ancillary and experimental plants, develop new and more efficient processes and operating techniques and convert Richland, a wartime city even more primitive than Oak Ridge, into a more stable and livable community.⁸³

81. *Ibid.*

82. The AEC informed the author on May 21, 1951 that four reactors had been built at Hanford.

83. Most of the land within the Hanford Area was and still is desert, although 50,000 acres of the Wahluke Slope are scheduled for irrigation as part of the Columbia Basin Project. Like Oak Ridge, the Hanford site was chosen for its isolation, the small number of residents to be displaced by the new construction, and the accessibility to electric power and water. Again as at Oak Ridge, the servicing communities had to be built from the ground up. The adjoining towns of Pasco and Kennewick (12 and 10 miles, respectively, east of Richland and providing the nearest passenger-train service) were soon over-crowded. On-site living quarters, as well as schools, hospitals and other community plants were a prime requisite.

Richland lies in the south-east portion of the area; twenty five miles up the Columbia River is the ghost town of Hanford, headquarters during the war for the main construction program. At peak, late in 1944, Hanford (the town) had a population of 51,000; it has now been entirely evacuated and its buildings, all temporary, have been removed for other uses. Five miles north of Richland is the town of North Richland, established in 1947 as a construction camp, with a population in 1949-1950 of about 13,000. Its buildings are also temporary, and the camp will presumably be abandoned as the requirements of the construction program diminish.

Until World War II, Richland itself was an incorporated farm community with an estimated population of 300 persons. The new city was initially built and operated by du Pont under contract to and supervision of the Manhattan Engineer District. Its population after the first sharp spurt has fluctuated between a 1946 minimum of 13,000 and the present (1951) population of 22,000. Housing and community services at Richland have to some extent been renovated and substantially expanded since the war; additional schools have been built and old ones enlarged; new areas for business and home sites have been laid out; roads and transportation facilities have been improved. Today it is taking on many of the characteristics of a permanent city.

Two of the differences between Oak Ridge and Richland should be noted. Unlike Oak Ridge, Richland was never confined within guarded barriers. As a consequence commercial interests have had a somewhat easier access to the town, though such establishments must also (as at Oak Ridge) be licensed by the contractor-manager. A second point of difference relates to housing. The housing deficiency at Richland has been more acute and of longer duration than that at Oak Ridge.

"Whereas at Oak Ridge the principal problem is the replacement of marginal and submarginal housing, at Hanford the Commission faces the task of supplementing existing housing (much of which continues to be 'marginal and submarginal') in order to accommodate the personnel required to staff the expanding operations."

FIFTH SEMIANNUAL REPORT 32 (1949).

Richland is in every sense a company town, managed by the same contractor who operates the plants. When du Pont withdrew from atomic energy activities in 1946, the General Electric Company succeeded as plant operator and city manager. While the

Los Alamos

On an isolated New Mexico mesa, 7500 feet above sea level and 35 miles north of Santa Fe, is the Commission's 69,000 acre Los Alamos center for the development of atomic weapons. Located there are the main installations of the great Los Alamos Scientific Laboratory and its supporting community. The site's remoteness facilitates the maintenance of secrecy and provides the space necessary for extensive testing grounds. These advantages commended the region to the Manhattan District, and in April, 1943, it began to build the temporary structures that were to house the plant and the workers.

From the start (although the scope of the contract has since been changed), the Los Alamos Laboratory has been operated for the Government by the University of California. To Los Alamos during the war came many of the leading scientists of the U. S. and Great Britain—and a large group of the most highly skilled technicians—to design, develop and build the weapon whose first exemplars were detonated at Alamogordo, Hiroshima and Nagasaki. Then, as now, the first work of the laboratory was weapon development and research “on the physical, chemical, metallurgical and nuclear properties of fissionable materials and other materials of interest”;⁸⁴ in addition, investigations into the effects of radiation on living organisms and into other problems of biology and medicine were (and are now) undertaken on a considerable scale. Initially Los Alamos was the bomb factory as well as the research and development laboratory. But now that these weapons are produced in considerable numbers, manufacture has been decentralized,⁸⁵ and Sandia, among other installations, has taken on the job of fabricating parts of the bomb, and perhaps also (though the facts are secret) of final or at least sub-assembly.⁸⁶

primary responsibility for most of the municipal activities and the others which in a normal community would be privately run is held by the Atomic Energy Commission, the actual conduct of affairs has been delegated by contract to General Electric. “Commercial establishments operating within the reservation are licensed and operated under the supervision of the General Electric Company, which acts for the Government in these matters. By agreement with local authorities, the school system in Richland is operated as a regular district in the Washington school system, with financial support from the state. The Commission, however, also supports this operation by payments to the school district and by providing the physical plant.” *Ibid.* AEC officials have overriding authority as to community policies; resident G. E. officials control day-to-day administration. There is a “town advisory council,” limited to consultative functions, which represents the citizens of Richland.

See also *Hearings before the Joint Committee on Atomic Energy on Investigation into the United States Atomic Energy Project*, 81st Cong., 1st Sess. pt. 15, 621 *et seq.* (1949).

84. FIFTH SEMIANNUAL REPORT 42 (1949).

85. *Id.* at 43. See also SEVENTH SEMIANNUAL REPORT 9 (1950).

86. The laboratory buildings and other operational facilities erected at Los Alamos in the war years were “crowded into a small area” and were “highly unsatisfactory from the standpoints of economy, efficiency, security and safety.” FIFTH SEMIANNUAL REPORT 4 (1949). Additional structures were built after the war, but it was soon evident

Savannah and Paducah

A few words should be added regarding two additional production centers on which construction had barely got under way in early 1951.

On November 28, 1950, the Commission announced plans for construction of a new plant in South Carolina. The Savannah River Plant to be designed,

that "the construction of new technical buildings at another location at Los Alamos [would be] needed for future progress and flexibility in the atomic weapons program and for eventual dollar economy." *Ibid.* In 1949 and 1950 considerable progress was made in the construction of new research facilities "removed from residential and administrative areas"; SEVENTH SEMI-ANNUAL REPORT 11 (1950); SIXTH SEMI-ANNUAL REPORT 1 (1949). Further plans were laid for the eventual replacement of all temporary buildings by structures designed for specific types of work.

When the Manhattan District selected the Los Alamos mesa for the site of its secret laboratory "the only structures on the site consisted of a handful of buildings which once constituted a small board school." SMYTH, *op. cit. supra* note 70, at 207. Within a comparatively short time, research quarters for more than 3000 scientists, engineers, technicians and other workers had been set up; a small town mushroomed into existence with temporary housing, a church, a hospital, schools, stores and recreational facilities. The end of the war saw many of the key figures at Los Alamos return to their previous peacetime jobs in universities and industry and a general decline in population. The emphasis during the last few years on military preparations has reversed the trend, the population increasing from 7000 to 13,000 (1951). A considerable effort has been made to improve and expand the town housing; but even as late as 1948, when the Commission was putting up solid individual homes and apartment houses, the shortage of living quarters made it necessary to establish a trailer camp, convert barracks into dormitories and invoke other equally unsatisfactory expedients. A large community center was completed in 1948; existing schools have been enlarged and a new high school built. Other structures added by the AEC include a power plant, new water supply line, steam generating plant, propane-air gas plant, medical center building, airport.

Management control of the town of Los Alamos has been delegated to the Zia Corporation. Zia's functions and authority at Los Alamos closely resemble those of Roane-Anderson at Oak Ridge and of General Electric at Richland. Local AEC officials pass on policies; the contractor provides all services either directly or through subcontractors, and a town council acts as "an advisory body on community affairs." FIFTH SEMI-ANNUAL REPORT 47 (1949). Medical, dental and hospital services are controlled by a non-profit corporation, the Los Alamos Medical Centre; private commercial concessions to provide the usual goods and services have been granted. The Los Alamos schools are run under contract by the Los Alamos County Board of Education; the Commission contributes the physical plant and a portion of the operating expenditures, but the Board has "complete freedom with respect to application of academic policies and procedures as prescribed by the State of New Mexico." EIGHTH SEMI-ANNUAL REPORT 176-7 (1950).

Certain jurisdictional problems affecting the legal status of Los Alamos residents were solved by an act of Congress in 1949; Los Alamos citizens "now have available the legal remedies and recourse to state courts enjoyed by citizens in all other parts of the state. Los Alamos County is a legal entity for voting purposes, and the county sheriff can enforce State laws within the county." SEVENTH SEMI-ANNUAL REPORT 12 (1950). "New legislation has recently been obtained from the State of New Mexico which, among other things, grants to the County of Los Alamos ordinance-making powers comparable to those of New Mexico municipalities, grants to the county the power to pay salaries for certain full-time employees, and provides for popular election of school boards." TENTH SEMI-ANNUAL REPORT 7 (1951).

built and operated for AEC by du Pont was to be laid on a 200,000 acre tract in Aiken and Barnwell Counties, its center about 20 miles southeast of Augusta, Georgia.⁸⁷ The exact purpose of the plant was officially a secret. It was generally known, however, that its construction represented the first major step in the program to build hydrogen bombs; that it was to serve as a production facility for tritium, the heavy isotope of hydrogen, necessary for the manufacture of weapons depending on nuclear fusion. It was estimated that the total cost of the plan will run about \$700,000,000.⁸⁸

An new facility to produce uranium 235 by gaseous diffusion was the subject of a request by the President, on December 1, 1950—for additional funds from Congress. The plant was to stand on a 5,000 acre site, including lands now comprising the Kentucky Ordnance Works, 16 miles west of Paducah, Ky.⁸⁹ After the appropriation had been approved it was announced that the F. H. McGraw Co. of Hartford, Conn. would be the principal construction contractor; that at peak 10,000 workers would be engaged on construction; that the plant was to be operated by Union Carbide and Carbon Corp., production and research contractors at Oak Ridge, with an operating force of 1600.⁹⁰ The electrical power needed for the operation is to be supplied half by the Tennessee Valley Authority, half by a group of five private utilities organized for this purpose as Electric Energy, Inc.⁹¹

II. STATUTORY DEFINITION OF FISSIONABLE MATERIAL

Since fissionable material is the core of the control problem, its definition is the heart of the Act. The discussion has indicated what materials—in the present stage of scientific knowledge—are fissionable, and it has emphasized the indispensability of uranium to the release of atomic energy on a large scale. From these data, it is possible to draw a definition of fissionable material adequate for the present, although even this task presents some difficulties. However, in view of the likelihood of further advances in this experimental field, Congress would have been ill-advised to assume that

87. NINTH SEMIANNUAL REPORT 4 (1951).

88. Letter from AEC to the author, May 21, 1951. See also TENTH SEMIANNUAL REPORT 13-14 (1951).

89. NINTH SEMIANNUAL REPORT 4 *et seq.* (1951). TENTH SEMIANNUAL REPORT 13 (1951).

90. NINTH SEMIANNUAL REPORT 5 (1951). It was estimated that the cost of construction would be about \$350,000,000. (See United States Atomic Energy Commission, Release No. 333, Dec. 21, 1950).

91. The companies are Central Illinois Public Service Co., Illinois Power Co., Kentucky Utilities Co., Middle South Utilities, Inc., and Union Electric Co. of Missouri. These companies are to construct "a large power plant capable of supplying half of AEC's requirements. They also proposed to put in interconnecting lines through which any power excess to AEC's needs could be fed back into the utilities' systems and power excess to the utilities' needs would be available to AEC, especially during the interim period." NINTH SEMIANNUAL REPORT 5 (1951); TENTH SEMIANNUAL REPORT 13 (1951).

the list of fissionable materials it was able to draw in 1946 would have permanent validity.

An alternative to the attempt to specify all fissionable materials would have been to entrust the Commission with complete discretionary authority to draw its own definition. In effect, Congress did both: it listed the materials currently known to be fissionable (with due regard to security considerations) and conferred upon the Commission authority to amplify the list as circumstances warrant. Fissionable materials are enumerated as:

Uranium enriched in the isotope 235. In other words, uranium that, as a result of technical processing, contains more than 7/10 of 1 per cent of the dangerous isotope, U-235. Note that this percentage is not a reference to the fission threshold; the product of any process that minutely enriches uranium in the 235 isotope is legally "fissionable" material, whether or not it can in fact sustain a chain reaction.

Plutonium. This element, not found in nature (except possibly in insignificant traces) but produced artificially by transmutation of uranium, is included without qualification.

*"Any other material which the Commission determines to be capable of releasing substantial quantities of energy through nuclear chain reaction of the material."*⁹² The Commission is thus to act as a court of scientific judgment and modify its rulings to meet changed conditions growing out of future discoveries. The Commission exercised this power in announcing (April 14, 1948) that the "isotope Uranium 233, and any material artificially enriched thereby, constitutes a fissionable material within the meaning of the Atomic Energy Act of 1946. Uranium 233 is derived from Thorium 232 by a transmutation process similar to that used in converting Uranium 238 into Plutonium 239.

*"... or any material artificially enriched by any of the foregoing."*⁹³ Any material to which there have been added amounts of fissionable material, as previously defined, is denominated "fissionable" for the purpose of bringing it under the controls of the Act. The Commission also included this qualification in its ruling declaring U-233 a fissionable material. It is again irrelevant that these artificially enriched materials may be incapable of sustaining a chain reaction.

Around this central point, the definition of fissionable material, is arranged the entire control pattern of the Act. The definition determines the boundaries of government ownership of materials and facilities in the general field of atomic energy,⁹⁴ and it adumbrates the system of governmental controls in the area

92. Section 5(a)(1).

93. *Ibid.*

94. The Act's provision on the ownership of fissionable material is direct and sweeping:

"All right, title, and interest within or under the jurisdiction of the United States, in or to any fissionable material, now or hereafter produced, shall be the

left to private ownership. It was framed in the manner of an axiom or postulate in mathematics, upon which, as foundation, a sound superstructure might be erected. How well the definition serves the purpose for which it was intended will appear in the analysis that follows.

property of the Commission, and shall be deemed to be vested in the Commission by virtue of this Act." Section 5(a)(2).

But the interpretation of this provision's consequences and the procedure for carrying it out present difficulties.

At first glance it might appear impossible to eliminate by legislative fiat private ownership of substances whose sources are to be found almost everywhere in the earth's crust. But, as already noted, the problem has definable boundaries and can be reduced to an area that one may hope to control. For control purposes, only fissionable material artificially produced requires attention. The traces of fissionable material distributed in minute quantities throughout the globe can be safely disregarded and attention centered on U-235, U-233, plutonium, thorium, protoactinium, and other fissionable substances "as the Commission may determine" in the future. It is too early to say whether the hydrogen bomb will alter the perspective and whether it will be necessary to add to the control scheme a new series including tritium and other "fusionable" materials.

Fissionable material in quantities of military significance must, for obvious reasons, be owned by the state. Such ownership complements state ownership of production plants. But since the Act permits private ownership of small facilities that produce modest quantities of fissionable materials in the course of research and development, it may be asked why private ownership of the material itself cannot likewise be tolerated.

The restriction, like others in the Act, is based primarily on an appraisal of safety and security requirements. Even a small research production plant is a fairly substantial installation, difficult to conceal, impossible to move on short notice. But fissionable material, even in minute quantities, can be lethal, and while the critical mass required to produce an explosion is substantial, the possessors of small amounts, if bent on mischief, might pool their supplies and assemble a bomb of enormous destructive power.

Since only the government may own fissionable material, the amounts accumulated by private research organizations automatically become the property of the Commission. To meet legal requirements, the Act provides: "Any person . . . who lawfully produces any fissionable material incident to privately financed research or development activities, shall be paid just compensation therefor." Section 5(9)(2). Just compensation is also provided for fissionable material that was privately owned when the Act became effective or that was declared to be a "fissionable material" at some later time. No compensation is provided for material produced in private research under government contract.

Control over fissionable material is strengthened by two further provisions. The first (Section 5(a)(3)) makes unlawful, after sixty days from the effective date of the Act, the transfer as well as possession of fissionable material, "except as authorized by the Commission." Also forbidden is the "export from or import into the United States" of any fissionable material. The prohibition of exports probably does not affect the authority of the President to ship fissionable material (or an assembled nuclear weapon) for storage in foreign countries for the use of American military forces. But his authority to transfer ownership of fissionables to a foreign government allied with the United States in a military pact, even under his great powers as Commander-in-Chief, is much more doubtful.

Sweeping authority is given the Commission "to purchase or otherwise acquire any fissionable material or any interest therein outside the United States." Section 5(a)(5). The Commission is also empowered to purchase, or otherwise acquire, "any interest in facilities for the production of fissionable material, or in real property on which such

III. DEVELOPMENT OF POLICY

The quotation from Harold Ickes at the head of this article was taken from testimony Mr. Ickes presented before the Senate Special Committee on Atomic Energy early in 1946, while he was still Secretary of the Interior. Mr. Ickes, paladin of the New Deal, had ridden on the left flank of the Democratic Party ever since his belated initiation. Even during the heyday of his chief, his truculent defense of the public interest against what he considered private greed had alarmed members of his own party who thought it unnecessary to draw the line between the two spheres with as sharp an instrument as Mr. Ickes wielded; among the opposition, it spread consternation and occasional hysteria. But on this occasion, when he pronounced doctrine of a portentous radical beyond all his earlier utterances, Mr. Ickes received sympathetic agreement from a Senate Committee that certainly had no leftward inclination. He advocated nothing less than the nationalization of atomic energy, a force that might ultimately displace both coal and water power in our economy. And while no one endorsed Mr. Ickes' statement by quoting Sir William Harcourt's somewhat exaggerated characterization of Parliament a half century ago—"We are all Socialists now"—nevertheless, so far as the Committee's charter extended, the quotation would have applied. It may well be that among all the transmutations ultimately to be worked in the field of nuclear physics none will surpass in mystery the alchemy whereby a group of Senators, most of whose names were anathema to the left-wing press, were without exception transformed for a brief time into state Socialists.

Under the compulsion of a necessity they could not escape, Congress established a state monopoly of the means of producing fissionable material and of the material itself. In the search for the most conservative of all ends—security—it was found necessary to adopt these radical measures. The declaration of policy makes it clear that the Act has "the paramount objective of assuring the common defense and security." This purpose is overriding: it dictates an impressive list of restrictions and controls designed to cope with the abuses and dangers it was possible to anticipate would attend this enormous destructive force.

The reasoning whereby the Senate Special Committee arrived at the conclusion that atomic energy was too powerful to be left to private individuals was set forth in its report recommending the enactment of S. 1717, the McMahon-Douglas bill. Since the members of the Committee, by virtue of their prestige both in Congress and in the country, were largely responsible for the passage of the act in a form close to the bill they recommended, this report assumes unusual historical significance. The tenor of the document

facilities are located. . . ." *Ibid.* Finally, the Commission is authorized—upon proffering just compensation—"to take, requisition or condemn, or otherwise acquire any interest in such facilities or real property." *Ibid.*

is epitomized in the following conclusions reached by the Committee with respect to fissionable materials:

"From the start of its deliberations the Committee has been convinced that an absolute government monopoly of production of fissionable materials is indispensable to effective domestic control of atomic energy. A number of factors point unmistakably in this direction:

"1. Fissionable material is the principal ingredient of the atomic bomb. Thus, to permit private manufacture of fissionable material would be to permit private manufacture of material of enormous destructive potentialities.

"2. The production of fissionable material is attended by serious hazards to public health and safety. The responsibility for minimizing these hazards is clearly a government function.

"3. The future production of fissionable material is closely inter-related with the possibility of achieving effective and reciprocal international safeguards against the use of atomic weapons. It is undesirable, therefore, to permit private development in an area which may soon be placed under Government control by reason of international agreements.

"4. The production of fissionable material is technologically in its infancy; unforeseen and unforeseeable factors may play a great part in its development. To permit decontrol and decentralization of this activity, and weaken continuing Government supervision, would be contrary to the principle of prudent stewardship demanded of the Government by considerations of national defense and national welfare.

"5. The technology of fissionable material production teaches that even a slight interruption in the manufacturing process may occasion great loss and damage to the entire operation. Government control is more likely to assure continuity of operation than is private control." ⁹⁵

As may be seen from the above, considerations of national defense and security were primary; though they were, to be sure, reinforced by the necessity for guarding the public health and safety and by the anticipated adoption of a system of international controls. The legislators saw, moreover, that merely to prohibit the private manufacture of atom bombs would give no more assurance of effective control at home than a bare pact to outlaw atomic weapons would offer in the international field. Fortunately, fissionable mater-

95. SEN. REP. NO. 1211, 79th Cong., 2d Sess. 14-15 (1946).

ial is not found in nature and can be produced only by elaborate processes in huge industrial plants. State ownership of the facilities that perform these processes and of the fissionable material thus produced was therefore deemed to be at once a necessary and a sufficient condition for an adequate control system.

One further consideration justifies monopolistic government control and helps to define its limits. The practical application of atomic energy was made possible through an initial government expenditure of almost 3 billion dollars. Production plants, laboratories, stockpiles of raw materials, technical experiments relating to the production of fissionable material, were all paid for out of the public purse. In view of these widely known facts it was difficult to challenge the proposition that what the people had bought rightfully belonged to the people.

It would be well, therefore, to turn aside here for a moment to weigh how much the formally unassailable proposition that the nation's economic stake in the development of atomic energy should be fully preserved actually influenced the Congressional decision to establish a government monopoly. Since the play of motives is somewhat blurred, the historian must be careful not to misread them, but a careful and objective examination of the history of the Atomic Energy Act dissolves all doubt on this score. Of the several reasons given above to justify and indeed to require government monopoly of atomic energy, only that of national security decisively influenced the majority of the legislators who voted for the McMahon-Douglas Act. The Congressional debates and other circumstances surrounding adoption of the Act overwhelmingly support this conclusion. To discern in these events a regard for the public equity in atomic energy or an attempt to find means by which the American people might be recompensed for their huge investment, is to read into them what did not exist. The reasons for this indifference are neither mysterious nor obscure. Anyone who follows the day to day activities of Congress is familiar with the paradox of politicians alternatively pinch-penny where small items—especially those in departmental budgets—are concerned, and profligate with respect to military or police appropriations, the disposal of war surpluses and the like. Vast industrial plants that were built with public money during the war were often sold for a slight fraction of their cost; no serious thought was accorded the possibility of continuing to operate them as state enterprises for the common benefit. After the second world war, as after the first, abuse by executive departments of their public trust in the handling of surpluses, and legislative supineness toward this malpractice, became a public scandal.⁹⁶ Moreover, the mood of the period in question, as reflected in Congress, was to get the Government out of business,

96. For a few examples—many more could be cited—of abuses of this kind, see MISCELLANEOUS REPORTS OF THE PREPAREDNESS SUBCOMMITTEE OF THE COMMITTEE ON ARMED SERVICES, UNITED STATES SENATE. Under the authority of S. Res. 93 (81st Cong.); S. Res. 18 (82d Cong.).

lift war controls and to return to "normalcy," preferably pre-New Deal normalcy, as quickly as possible. There is no evidence whatever that considerations of the public equity affected the natural predilections of Congress to turn over the atomic energy business to private industry.⁹⁷ Several of the supporters of the McMahon Act deemed it necessary to demonstrate that their stand had been adopted reluctantly, that their actions must not be taken to signify a diminution in their admiration for private enterprise.⁹⁸ To override these convictions, nothing less was required than a plain showing that there existed a mortal threat to the nation, a threat compelling the adoption of extraordinary—and extraordinarily distasteful—measures. The reason for the monopoly features of the Atomic Energy Act was, so far as Congress conceived it, reason of state. This, as will be seen, was a factor of utmost consequence in the evolution of Commission policies.

(3) Although the Atomic Energy Act sets up a comprehensive system of restrictions and controls, and contains explicit and adequate acknowledgment of the constructive possibilities of atomic energy, it is vague as to positive guidance and specific standards to be followed. The several sonorous generalities about "improving the public welfare," "increasing the standard of living," "assuring the common defense," do nothing to remedy this deficiency.

This vagueness may in part be ascribed to the novelty and difficulty of the problems here confronting the legislature; in part to the general belief in Congress that the Commission could, until international issues and the prospects of industrial and commercial use of atomic energy (atomic power, principally) had been clarified, simply continue the operation as it had been conducted by the Manhattan District.

The Commission, however, was expected to handle a number of complex matters, with which the Manhattan District did not concern itself. These included, among others, the determination, for economic and scientific as well as defense objectives, of the quantity of fissionable material to be produced (*i.e.* to make recommendations on this score to the President); the assurance of an adequate, uninterrupted supply of source material by means of dependable, long-term contracts with other nations and the exploration and development of domestic resources; the encouragement of laboratory research and technical development; the renovation on a permanent basis of the vast plant of the atomic energy project, including not only the industrial installations, reactors, laboratories, chemical separation factories, etc.,

97. In the House debates on the Atomic Energy Bill, 92 CONG. REC. 9249-9275, 9340-9386, 9464-9477 (1946), it is almost impossible to find a single statement supporting the legislation, on the ground that since the industry had been built out of public funds it would remain public property. The few speakers adumbrating the point considered it prudent to hedge their stand with qualifications. See *e.g.*, remarks of Representative Jerry Voorhis of California, *id.* at 9271.

98. See *e.g.*, remarks of Representative Clare Booth Luce of Connecticut who rose to support the act "with a very heavy heart, indeed," *id.* at 9261.

but also the temporary wartime cities housing thousands of scientists, workers and their families.

Though the Commission had to make its way through this maze of responsibilities with little guidance from the Act itself, it had at least one firm bearing by which to set its course: the country was troubled as never before in its history—absolute safety through absolute strength was the visionary goal. International events and the response to them in many quarters at home were to exert a more decisive influence on the Commission's policies, to polarize its activities to a greater extent, than any formal provisions of the atomic energy charter.

The year 1946 was a time of tension. There was talk of "preventive war" even before the Atomic Energy Act was adopted; the marked deterioration of United States-Soviet relations coincided with the formative period of the Act and strongly influenced the framing of its provisions. From the day the Commission took over, it was to find its record of management judged in final analysis, by a single criterion: the rate of growth of the stockpile of bombs. Since this datum was kept secret even from the Joint Committee—on its own insistence—the test was whether the Defense Department, through its Military Liaison Committee, was satisfied. Had it not been content that bombs were being turned out (and improved) at the highest possible rate, both the President (who fixes the annual bomb quota) and Congress would undoubtedly have intervened.

But if worsening relations with Russia, the anxieties of the nation, the urgings of Congress and the directives of the President made the Commission's path clear, it also made it narrow. Enforced concentration on the military phases of atomic energy substantially reduced the effort and the funds that the AEC could devote to other phases of its franchise. The planning program for peacetime uses of atomic energy which was to have challenged the Commission's imagination and resourcefulness was relegated to a comparatively minor place. The goal was a mountain of bombs; the supreme task was to increase their production and to improve their destructiveness, and an agency of broad social planning was reduced to a technical arm of the government arsenal.

Still, in order not to paint the situation darker than it is, one important, if accidental, fact mitigating this purely military trend should be noted. Fissionable material is a source of energy which can be turned to constructive as well as destructive uses. It is a tool or a weapon according to its owner's intentions. Similarly, the knowledge gained in nuclear engineering and reactor development can, in many respects, serve equally well either military or peaceful ends.⁹⁹ Thus, though the Commission has spent the bulk of

99. It is of course important to remember that the reverse is true: that a pile producing industrial power is also a formidable source of material for bombs and that a peacetime advance in nuclear technology may be turned to military advantage. This fact raises one of the major difficulties in constructing an effective system of international control of atomic energy.

its huge annual appropriation on the making of weapons, the fissionable material accumulated, the knowledge gathered, are capable in better times of being put to better use.

IV. RESULTS OF FISSIONABLE MATERIAL PROGRAM

Since the major responsibility of the Commission is the production of fissionable material, the "realistic" yardstick of its success is the quantity, and the acceleration, of its output. Production rates are strictly classified as is any information that might furnish a clue to the atom bomb stockpile. Nevertheless, a body of evidence does exist as to the Commission's accomplishment.

The Commission itself has made public, through its semiannual reports, a series of progress reports on its fissionable material program. During its first two years of operation, the Commission carried on a double operation: it maintained, and even increased, output of fissionable materials with the facilities built by the Manhattan District, and at the same time it modernized these facilities and added new production capacity for the future. By the spring of 1948, the building of additional major facilities for the production of fissionable materials had, according to the Atomic Energy Commission, become "the greatest single construction program in American peace-time history."¹⁰⁰

In early 1949, the Commission reported, technical innovations had "succeeded in extending the useful life of the war-built plutonium-producing reactors,"¹⁰¹ and by the end of the year, an additional reactor to produce plutonium and a large plant to "fabricate" plutonium metal had been completed and put into operation.¹⁰² Further construction of facilities for an improved process of separating plutonium was underway during 1950, the Commission's schedule calling for completion of the work in 1952.¹⁰³ Similar progress was recorded at the gaseous diffusion plant at Oak Ridge.¹⁰⁴ Improvements all along the line in the processing of feed materials were also noted.¹⁰⁵

100. FIFTH SEMIANNUAL REPORT 2 (1949).

101. SIXTH SEMIANNUAL REPORT 5 (1949).

102. SEVENTH SEMIANNUAL REPORT 6 (1950).

103. EIGHTH SEMIANNUAL REPORT 170 (1950).

104. In 1949, the Commission announced that the production of U-235 had been made more efficient through new equipment and operating techniques. Construction was started on additions to K-25, the main gaseous diffusion plant. By mid-1950 these additions (known as K-29 and K-31) were said by the Commission to be proceeding on schedule. FIFTH SEMIANNUAL REPORT 2-19 (1949); SIXTH SEMIANNUAL REPORT 4 (1949); SEVENTH SEMIANNUAL REPORT 6 (1950); EIGHTH SEMIANNUAL REPORT 170 (1950); NINTH SEMIANNUAL REPORT 6 (1951).

105. Figures indicated that between 1946 and 1948 the production costs of feed materials were reduced 20 per cent. FIFTH SEMIANNUAL REPORT 10-12 (1949); SIXTH SEMIANNUAL REPORT 4-6 (1949); SEVENTH SEMIANNUAL REPORT 5-6 (1950); EIGHTH SEMIANNUAL REPORT 165, 171 (1950); NINTH SEMIANNUAL REPORT 6 (1951); TENTH SEMIANNUAL REPORT 12, 13 (1951).

Construction of a new feed material plant at Fernald, Ohio was underway in the summer of 1951. TENTH SEMIANNUAL REPORT 12-13 (1951).

In its Seventh Semiannual Report (January 1950), the Commission stated that the plants at Hanford and Oak Ridge had produced more fissionable material during the year 1949 than in any similar period in the history of the atomic energy program.¹⁰⁶ Again without citing figures, the Commission reported in July 1950 that its production of U-235 and plutonium during the first six months of this year had established "a new record rate, exceeding that of 1949."¹⁰⁷ Coupled with these Commission reports of increased production were claims that the Commission had been able to reduce the number of workers required for its production program and to reduce unit costs.¹⁰⁸

One must, however, seek evidence of the Commission's success or failure elsewhere than in its own reports, and some of that independent testimony is contradictory. During the 1949 Congressional hearings on the charges brought against Lilienthal by Senator Hickenlooper, President Truman told the American public that he was informed on the position of the United States in atomic energy and that the country was "making good progress." "Our situation," he said, "has been vastly improved in the last two years under the Atomic Energy Commission."¹⁰⁹ In its final report on the investigation of the Hickenlooper charges, the Democratic majority which cleared Lilienthal and the Commission of the charges of mismanagement, pointed out that the Military Liaison Committee "with knowledge of how many bombs we possess, with professional background and training, and with a duty to protest decisions harmful from a security viewpoint, has never taken an appeal against a Commission action or failure to act—whether in the field of weapons, production, research, or protection of secrets."¹¹⁰

On the other hand, we have the report made by the Republican minority on the Joint Committee which concluded:

"That although we now have more atomic weapon strength by a wide margin than any other nation, nevertheless, our national security demands bolder, speedier, and more effective development of our atomic

106. SEVENTH SEMIANNUAL REPORT 6 (1950).

107. EIGHTH SEMIANNUAL REPORT 165 (1950); TENTH SEMIANNUAL REPORT 12 (1951).

108. By May, 1949, the number of employees at K-25, Oak Ridge plant had been cut to 4,700 as compared with 11,400 early in 1947. SIXTH SEMIANNUAL REPORT 4 (1949). In its Eighth Semiannual Report, the Commission stated it had succeeded in producing U-235 and plutonium "at the lowest unit costs yet attained." EIGHTH SEMIANNUAL REPORT 165 (1950).

109. The President with his often shown common sense made a statement issued at the White House, May 26, 1949, which read, in part:

"It is time people stopped getting hysterical when the word atom is mentioned. The plain fact is that the atomic energy program is in good shape—and in good hands. I hope the Commission will soon be able to get back to work and that the atomic energy program will cease to be used for pre-election campaigns."

110. SEN. REP. No. 1169, 81st Cong., 1st Sess. 80 (1949).

program to meet the vital necessity of constantly maintaining and expanding our preeminence in this field.

"Since the establishment of the Commission almost 3 years ago, it has been aware, through authoritative recommendations, of the pressing urgency of putting into action certain programs that will strengthen our reserve of atomic materials and aid the objective of capturing and having available for effective use the largest practicable degree of the power of those atomic materials for weapon and other purposes.

"The Commission's approach to this supreme task has been leisurely, has been characterized by indecision, and a number of the most important of these recommended projects have not developed into operating plants."¹¹¹

Anyone who has examined with care the charges brought by Hickenlooper against the Commission and, in particular, against Lilienthal, will treat the minority report of the Joint Committee with scepticism. Though it raises valid points, it is in the main not the finding of a disinterested group of inquiry but rather a political pamphlet intended to cover up a bad case. When the minority report speaks of "certain programs," presumably neglected by the Commission, it is operating behind doors closed to the public. It is therefore difficult to arrive at any independent conclusion beyond the general one that the Commission has substantially increased the rate of production of fissionable materials. No outsider can judge whether or not the program might have advanced more rapidly. And, for that matter, neither majority nor minority report is entitled to much weight on this point since the Joint Committee—as it has asserted with a curious pride—"has preferred not to inform itself of weapons stockpile data." The historian will therefore turn with more confidence to the judgment of the chairman, J. Robert Oppenheimer, of the General Advisory Committee who told the Joint Committee:

"When the Commission took over, the future of the whole enterprise was uncertain, the continuity of production of fissionable materials was far from assured, the design and development of improved weapons was nearly stagnant. In each of these respects the picture had radically changed. Better weapons have been developed and tested, the production of materials has been substantially increased and assured, and a sound and forward-looking program has been established."¹¹²

If one measures the atomic energy program by the rate of production of fissionables and bombs, the data publicly available indicates quite plainly that it has been successful.

111. *Id.*, pt. 2, at 1-2.

112. *Hearings before the Joint Committee on Atomic Energy on Investigation into the United States Atomic Energy Project* 81st Cong., 1st Sess. pt. 7, 294 (1949).

V. PRIVATE PRODUCTION OF FISSIONABLE MATERIAL

Although driven by the demands of security to establish, at least in theory, a government monopoly of production and ownership of fissionable material, the legislative draftsmen of the Atomic Energy Act were aware that atomic energy development might stagnate if it were deprived of the imagination and resources of independent research and private industry. They did what they could to leave doors in the fence.

The Act provides that the Commission, as agent of and on behalf of the United States, shall be the exclusive owner of all facilities for the production of fissionable material "other than facilities . . . which are useful in the conduct of research and development activities" in all fields of scientific investigation, pure and applied, relating to atomic energy.¹¹³ Such facilities must not "in the opinion of the Commission, have a potential production rate adequate to enable the operator of such facilities to produce within a reasonable period of time a sufficient quantity of fissionable material to produce an atomic bomb or any other atomic weapon."¹¹⁴

113. Section 4(c) (1) (A).

114. Section 4(c) (3).

In regard to regulation of the manufacture of production facilities, the draftsmen of the Act decided that the following relatively mild control by licensing would be adequate (Section 4(e)): "Unless authorized by a license issued by the Commission, no person may manufacture, produce, transfer or acquire any facilities for the production of fissionable material." Section 18(g) defines the latter term as follows: "The term . . . shall be construed to mean any equipment or device capable of such production and any important component part especially designed for such equipment or devices, as determined by the Commission." It is doubtful that this vague compendium affords the Commission a particularly precise or useful standard in deciding the concrete cases that confront it.

In issuing licenses the Commission has broad, flexible authority:

"Licenses shall be issued in accordance with such procedures as the Commission may by regulation establish and shall be issued in accordance with such standards and upon such conditions as will restrict the production and distribution of such facilities to effectuate the policies and purposes of the Act." (Section 4(e)).

On November 18, 1947, the Commission issued its regulations for the control and licensing of production facilities. In these regulations, the Commission adopted the Congressional definition to establish two categories: (1) any equipment or device capable of producing fissionable material and (2) any important component part especially designed for such equipment or device, as determined by the Commission.

In the first category, designated as Class I, are "(a) nuclear reactors or piles, (b) facilities capable of the separation of isotopes of uranium and (c) electronuclear machines (*e.g.* cyclotrons, synchrocyclotrons and linear ion accelerators) capable of imparting energies in excess of 1 Mev (million electron volts) each to positively charged nuclear particles or ions." Class II facilities include radiation detection equipment, mass spectrometers and component parts, and high vacuum equipment. Regulations of U.S. Atomic Energy Commission, pt. 50, Control of Facilities For the Production of Fissionable Material § 50.71. A specific license from the Commission is necessary for the manufacture, production, transfer or acquisition of any of the facilities designated as

In short, researchers may own their own production facilities and may operate them to make fissionable material in the course of their work. Thus the government monopoly was relaxed to place research in a specially privileged category, and a policy of freedom for research was expressed in concrete terms. The restriction on size is no hindrance because the amount of fissionable material produced in a research laboratory, or necessary to the continuation of its pursuits, is insignificant as compared with the quantity required for a bomb or for power production. In this branch of science and engineering the behavior of phenomena in the small extends to the same phenomena vastly magnified. The decision in the winter of 1942-43 to invest 350 million dollars in the extraction and purification facilities at Hanford (and the design of the plants themselves) was based on research findings made with only half a milligram (1/2000 gram) of plutonium.

Broad discretion is vested in the Commission in its interpretation of the phrase "to produce within a reasonable period of time a sufficient quantity of fissionable material to produce an atomic bomb or any other atomic weapon." What is a sufficient quantity? The size of the bomb, *i.e.*, the critical mass,

Class I, except that the statute exempts facilities which are (1) useful in research and development, and (2) do not, in the opinion of the Commission, produce enough fissionable material to manufacture an atomic weapon "within a reasonable period of time." *Id.* § 50.70n. This exception arises from the privileged position enjoyed by research in the Atomic Energy Act. Specific licenses are not required for the domestic manufacture, production, transfer or acquisition of Class II facilities. Such equipment may be manufactured, produced, transferred or acquired under a general license which, in effect, means an automatic authorization. *Id.* § 50.12(b). Each license (specific or general) requires the licensee to comply with certain conditions, including the filing of reports with the Commission. Licenses may be revoked or modified in the discretion of the Commission when the "public health, interest or safety" require such action or when the licensee has failed to comply with conditions of the license. *Id.* § 50.32. Other equipment may be added to the present lists from time to time as the Commission decides.

The Commission retains complete control over the export of production facilities. While such export is not explicitly prohibited by the Atomic Energy Act, the Commission's regulations provide that "A specific license must be obtained to authorize export from the United States of facilities for the production of fissionable material, or to authorize the manufacture, production, transfer or acquisition of such facilities for export." *Id.* § 50.11. Thus Class II as well as Class I facilities require specific licenses when produced, transferred or acquired for export.

The Commission has been sparing in its issuance of export licenses. The great caution with which the Commission has moved in the export field is a reflection of the suspicion with which the Joint Committee has looked upon any exports that might have the remotest connection with atomic energy and the fear of Congress as a whole, that such equipment might fall into Soviet possession. See EXPORT CONTROL AND ALLOCATION POWERS, ELEVENTH ANNUAL REPORT OF THE SECRETARY OF COMMERCE (1950).

Finally, the Act expressly authorizes the Commission to manufacture production facilities for its own use. Section 4(e). Under this authority the Commission may manufacture all types of facilities and components to be used at atomic energy installations. It is not empowered to manufacture such facilities for sale, since this practice would be deemed unwarranted competition with private industry.

is allegedly a military secret and could not therefore be revealed in the Act.¹¹⁵ What is a "reasonable" period of time? Congress, refusing to assume a task that legal scholars and jurists have for centuries evaded, provided no definition of this word. Instead, it was left to the Commission to determine for each research laboratory whether its rate of production, considered together with the nature of its facilities, justifies exemption from the general prohibition.

Since nothing less than a formidable installation will suffice to make "dangerous" amounts of fissionable material, the Commission has not thus far found it necessary to interfere with normal private laboratory operations. When the Atomic Energy Act was passed, U-235 and plutonium in "sub-microscopic amounts" (as Commission officials reported) were privately held, and it was decided to leave possession undisturbed. The practice has been continued as regards fissionables produced since then in the course of private research. It may be assumed the Commission has full knowledge of what is being produced, the manner of custody, and how the materials are used.

VI. GOVERNMENT PRODUCTION OF FISSIONABLE MATERIAL

Participation by Private Industry

All fissionable material, except for these very small amounts produced in private research, is today manufactured for the AEC by private industrial corporations operating under contract in Government-owned plants notably at Hanford and Oak Ridge. From their inception, the Manhattan Engineer District delegated the operations of these facilities through management contracts with several large industrial concerns—du Pont, Tennessee Eastman, Allis-Chalmers, Union Carbide and Carbon, General Electric, Monsanto Chemical, Kellogg, among them. The success of the project bespeaks the competence of the contractors. Management fees were not excessive; in some cases—du Pont, for example—they were nominal. But fees were, relatively, a minor reason for seeking a management contract. Patriotism undoubtedly played a part, but there were also considerations of business advantage: the acquisition of invaluable technical and engineering information and experience; the establishment of a reputation as a pioneer in an incalculably great industrial field; the opportunity to gain a march on future competitors (perhaps

115. The size of the bomb, or rather the *critical mass* of its charge, lies, according to the Smyth Report, between one and one hundred kilograms. See SMYTH, *op. cit. supra*, note 70, at 50. But for more precise and informative estimates, which appear to be reliable, see *e.g.* the New Republic, April 3, 1950, which in a special section, *Atomic Energy: The Technical Facts*, offered on the basis of various reports an estimate of 10 kilograms or 22 pounds of U-235 or plutonium as the "critical mass." It cited numerous articles in the Russian, British and American scientific press in which the critical mass was placed at anywhere from 14 to 30 pounds, with 22 pounds as a median.

There has been conjecture that within the last year technical advances and improved methods have lowered the 22 pound requirement for the critical mass. See *e.g.*, N.Y. Times, Jan. 21, 1951, p. 36 col. 1; *id.*, Jan. 29, 1951 p. 18, col. 3; *id.*, Feb. 4, 1951, § 4, p. 9, col. 6; *id.*, Feb. 7, 1951, p. 1, col. 2.

the chance to enjoy an at least temporary monopoly); the possibility of acquiring valuable patents as an outgrowth of research and development activities conducted at federal expense. Such considerations in no way diminished the cordial cooperation of private industry with the Manhattan Engineer District.

Except for du Pont, which withdrew from operation of the Hanford facilities at the end of the war, to be succeeded by General Electric, most of the large industrial companies which had been associated with the Manhattan District continued with the Atomic Energy Commission. Du Pont has since returned to the fold.

Nevertheless, it seemed for a time that industry's enthusiasm for the atomic energy business was cooling, a change of heart viewed by the Commission with no little apprehension. A number of factors contributed to the decline in interest. The early days of peace brought a spate of romantic speculation as to the marvels of the atomic future. Despite the sober counsel of those competent to judge, it was freely predicted and widely believed that the age of limitless practical applications of atomic energy was not far off. While some industrial firms and investors were cautious, not to say sceptical, a good many were prepared to stake a claim in the vast and profitable area soon to be opened up. Disillusionment, however, was rapid: it became evident, first, that large scale power production would not be feasible for at least fifteen or twenty years; second, that to enter the atomic power business would require tremendous capital; third, that the commercial opportunities of atomic energy immediately available—for example, the use of radioisotopes or the manufacture of radiation detection instruments—required considerable experience and promised neither speedy nor large monetary returns. In short, the golden atom was a will-o'-the-wisp. The industry would develop slowly; more important, it was obviously made to order for the giants.

The Atomic Energy Act, with its provisions for government monopoly and the elimination in major areas of private patents, further dampened the ardour of potential industrial investors, including even those who could afford to take a long-term view. When the du Pont interests withdrew from the field, the action was ominously interpreted; they knew the project well and had presumably weighed its possibilities for private capital, even giant private capital. It was not surprising, then, that other companies hesitated to renew their contracts; for a time the Commission, which from the beginning had resolved to continue the management contract methods of the Manhattan District, peered into an alarming future. If the corporations then carrying on the work walked off the job, the Commission feared it might be unable to run the plants thus thrown back in its lap. Every effort was made to hold the pioneer firms and to attract new ones.¹¹⁶

116. There were exceptions to this general rule. One of the firms which was glad to get out of the business and which the Commission made no effort to hold was Eastman Kodak's subsidiary, Tennessee Eastman, prime contractor during the war for the Oak Ridge, electromagnetic separation plant. See *The Atom and the Businessman*; *Fortune*, Jan. 1949, p. 53 *et seq.*

The Commission employed several blandishments: it liberalized management contracts, sought prominent industrialists as consultants; it took every opportunity to shape and enunciate a policy which would facilitate the earliest possible transfer of the atomic energy business from government to private control. That this objective could not actually be attained without drastic revision of the Atomic Energy Act and that the policy adopted by the Commission thwarted certain purposes of the Act (if the provisions declaring these purposes were not to be robbed of all meaning) were objections raised by few and heeded by none. Influential members of the Senate Committee which had heard Lilienthal on confirmation made it plain that they regarded government ownership of the atomic energy business as an odious and temporary expedient.¹¹⁷ The AEC, in their opinion, was no more than a steward for private enterprise, and an important part of the steward's job was to prepare for the master's arrival on the morrow. To this interesting interpretation of the Atomic Energy Act, Lilienthal and his colleagues on the Commission gave fervent approval. These exertions have borne fruit. The atomic energy project today is safe in the hands of private managers; not a single major operation burdens the Atomic Energy Commission itself.

The state monopoly of atomic energy is in practice run almost entirely by a tiny but extremely powerful group of private industrial companies. More than 90 percent of the Commission's budget goes to contractors. Commission employees number 5,000; contractor employees, more than 90,000. Contractors operate the feed-material plants, the separation plants and piles producing fissionable materials, the research, basic and applied, on all phases of the project, the towns serving the major installations. The fabrication of bomb components is also, as we have mentioned, handled by private companies.¹¹⁸

By means of this wholesale delegation of functions, and by dangling the hope of future industrial sovereignty in the field, the Commission has enlisted the skill of a few of the largest American industrial and engineering firms. The AEC is obviously content and its contractors have no cause to be dissatisfied. In place of the dreams of fantastic profits in the immediate future is the fact of adequate present returns and the prospect of much richer dividends within a few years.

117. *Hearings Before the Senate Section of the Joint Committee on Atomic Energy on Confirmation of the Atomic Energy Commission and the General Manager*, 80th Cong., 1st Sess. 16-17 (1947)

"Senator Millikan: . . . Are you temperamentally suited to the release of the whole subject [atomic energy] to private enterprise?"

Mr. Lilienthal: Yes. . . . I see no real danger in it. I think that if we are rather cautious about this, and proceed from case to case, there will be ample room found for just the sort of thing you were saying." *Id.* at 18.

118. The Commission has retained for itself, it may be noted, operating responsibility for all phases of its security program. While it has presumably not found any contractor competent "to take on its leaden burden of secrets . . . one might surmise that if Pinkerton's or Burns enjoyed the stature and prestige of G.E. or du Pont, the AEC would be happy to sign a security contract too." DAHL & BROWN, *op cit. supra*, note 30.

Companies which, like General Electric and Westinghouse, are vitally concerned with power equipment are willing cooperators with the Commission for obvious reasons. Without involving their own capital, they enjoy the inestimable advantage of conducting the research and developing the technology of atomic power. Others, like Carbide and Chemicals Corporation (subsidiary of Union Carbide), which runs the gaseous diffusion and electromagnetic separation plants at Oak Ridge and also the new installations at Paducah, du Pont, Dow Chemical, Monsanto Chemical, Kellex Corporation, each of which has an important assignment either directly for the AEC or as a sub-contractor,¹¹⁹ also have their technical interests clearly in view in participating in production management and in research and development.¹²⁰

Statutory Basis of Delegation

It must not be assumed from what has been said that the Commission in any sense exceeded its legal authority by delegating the production task. Under the Act, "[t]he Commission is authorized and directed to produce or to provide for the production of fissionable material in its own facilities."¹²¹ Moreover, the contribution that private industry must continue to make to the growth and development of atomic energy is expressly recognized. The Commission

119. It is difficult to keep track of precise contract assignments for each company, but the following are representative of the pattern within the last couple of years: Dow Chemical participates in research programs on, among others, chemical separation problems; Monsanto runs the important Mound Laboratory (chemical research) for AEC at Miamisburg, near Dayton, Ohio; Kellex is responsible to General Electric for process design, and is similarly involved with Dow Chemical.

120. *The Atom and the Businessman* Fortune, Jan. 1949, p. 53, offers interesting information on big industry's attitude towards taking part in AEC work. The following classification is suggested:

- "1. Industries that have nothing to do with the case—except, perhaps, for research programs (e.g. the huge tobacco industry).
- "2. Industries that may sometimes fit, but don't yet (*e.g.* the automotive industry).
- "3. Industries *in* the atomic world, but not *of* it (*e.g.* the industrial-plant-construction industry and big equipment suppliers).
- "4. Industries on the periphery, now partially drawn in (*e.g.* the oil industry and its plant designers).
- "5. Industries in which pertinent research and production have long been indissoluble (*e.g.* the great chemical and electrical industries)." *Id.* at 58.

The companies holding the major share of AEC contract business are those in Group 5, leading examples having been given in the text. The assessment placed on the value of its contract by Carbide and Chemicals is brought out in the answer given by a high Company official to the question "whether Oak Ridge could contribute anything to Carbide beyond its fee?":

"This is a frontier in a new technology. Carbide has pioneered before—in gases, alloys, chemical processes. It is glad of the opportunity to pioneer again. No question the future is uncertain, but we're willing to string along." *Id.* at 156.

121. Section 4(c) (2).

is to own the production facilities, but the Act provides that "[t]o the extent deemed necessary the Commission is authorized to make, or to continue in effect, contracts with persons obligating them to produce fissionable material in facilities owned by the Commission."¹²² One must grant that the continuity of operations essential to many phases of fissionable material production could not have been assured without some such provision. Thousands of workers, skilled, experienced, and proved, were at the end of the war operating the plants under private management. The Commission could scarcely have dispensed with their services, nor could Congress assume that an adequate number of workers, engineers, and technicians, would quickly exchange private for government employment.

The Act gave no direct instruction on the delicate matter of transfer of authority from the Manhattan District to the Commission, and the Commissioners certainly had the choice of carrying on existing arrangements or of striking out anew. Nevertheless, there were indications of Congressional preference. Section 1 (a) provides that "the development . . . of atomic energy shall, so far as practicable, be directed toward . . . strengthening free competition in private enterprise." While this in itself is scarcely more than a perfunctory stereotype, the legislative history of the Act and especially subsequent pronouncements by influential members of the House and Senate indicate that Congress was eager to offset the effects of the monopoly it had established—whenever that could be done without impairing security. A balanced interpretation of the Atomic Energy Act on this point could perhaps be summarized as follows:

First, wherever it could be accomplished *safely* and *efficiently*, government control plus private management was preferable to government ownership plus government management of production facilities. Progress in the development of constructive uses for atomic energy would depend on the extent of industry's participation in the production of fissionable material.

Second, the pattern set during the war, while deserving emulation, (if not inconsistent with other objectives of the Act) was too limited to serve as the model for the future. Opportunities to participate in production under government control were to be extended to new industrial concerns, large and small, which for various reasons had not been included in the several Manhattan District complexes. This position is reinforced by national defense considerations, which dictate a wide distribution of technical knowledge as well as of industrial facilities.

But the preference shown by Congress for the maximum safe participation of private industry in atomic matters has been interpreted by the AEC as a dogma (with the exception, however, that it has pleaded efficiency as a reason for not extending its management and construction contracts beyond a handful of large corporations). By its contract and labor policies it has endeavored

122. *Ibid.*

to divest itself of all operation and management functions, and it has done this even when resulting costs are demonstrably higher than they would be under government aegis (*e.g.* the community "housekeeping" operations). It has on frequent occasions adopted contracts apparently unfavorable to the public interest and justified them on the ground that industry must be "induced" to participate. Its resolution not to "interfere" with the independence of management has produced a situation in many respects unfair to organized labor and susceptible to recurrent labor tension. In other words, the Commission has elevated private participation above every other principle except possibly security.¹²³ What difficulties and criticism this position has brought down upon the whole project will shortly appear in detail.

123. Under Section 4(c)(2)(B) of the Act contractors are under obligation to "comply with all safety and security regulations which may be prescribed by the Commission." To police this obligation the Commission has had to assume the considerable burden of keeping itself informed on the activities of some 85,000 persons employed by contractors and subcontractors. See Lilienthal, Address to New England Council, Nov. 19, 1949, Atomic Energy Commission Release, 17-18, Nov. 19, 1949.

The Commission has sought to meet the security problem by dividing the employees of contractors and subcontractors into two groups: one is granted access to classified information or to classified areas; the other is not so privileged. Security clearance by the Commission, after FBI investigation, must be given all persons before admission to the first category. All AEC contracts contain detailed provisions relating to security and disclosure of information. Subcontractors must accept the same responsibility as prime contractors for conforming to security requirements. To reinforce the Commission's security control over subcontractors, prime contracts include the provisions that full security provisions must be inserted in all subcontracts.

So far as is known there have been no violations of important security regulations by contractors or subcontractors. Charges of laxity were made during the 1949 Joint Committee hearings, but the criticism—much of it was captious, if not purely spiteful—brought to light no real derelictions. See SEN. REP. No. 1169, 81st Cong., 1st Sess. 76 (1949). Perhaps the most widely publicized accusation was the alleged loss at the Argonne National Laboratory (the University of Chicago is contractor) of nine or ten ounces of uranium oxide. Wild "spy scare" stories appeared and some members of Congress issued statements that were models of irresponsibility. The FBI investigated; the Joint Committee sent a special investigator to Argonne and spent two full days hearing witnesses. In the end it turned out that tiny quantity of U-235 had apparently been lost, an accident normal to any manufacturing process; not a shred of evidence was produced to support the charge of gross negligence, much less the hysterical cries of espionage. The investigation, however, did serve to bring into focus the ignorance of the American people and their representatives on many of the most elementary facts of atomic energy. Thus, it was not until the Joint Committee investigation that the public was given information which threw into perspective the relative unimportance of the amount of U-235 that had "disappeared" and the intricate problems involved in accounting for every scrap of fissionable material. Without such information readily available, the American public could be frightened and their alarm turned to political mischief by reckless stories of apparent national disaster spread throughout the country.

The Commission and its contractors employ an elaborate, costly apparatus of guards and inspectors to maintain security. In 1950, the Commission had 1,400 persons engaged in its security operations, or almost 30 percent of its total staff of 5,000. See testimony of Chairman Gordon Dean, *Hearings before the Joint Committee on Atomic Energy in*

Criticism of Decentralization

The Commission's position was set forth as early as June 1947, six months after the transfer of assets from the Manhattan District. The Second Semi-annual Report to Congress stresses the importance of the participation of "well-managed industries and other private undertakings"; of the delegation of production and research to private groups, to be accompanied by the transformation of the War Department's highly centralized organization into a decentralized agency with broad operational authority vested in five major centers of operation.¹²⁴ In its Third Semiannual report the Commission was more explicit. The assignment of all major functions to "contractor-operators" was noted as an accomplished and intrinsically desirable fact. While the Act refers to private production contracts as a *method* of operation to be employed "to the extent deemed necessary" in the interests of safety and efficiency, the Commission elevates this alternative method to a major *objective*, the neglect of which would be equivalent to a dereliction of duty. "It is the policy of the Commission, subject to Congressional supervision as provided by the Act, *to move away from the present Government monopoly* (author's italics) provided by law as rapidly as feasible, having in mind the paramount consideration of the national security."¹²⁵

As part of its program to "increase individual participation for profit" and to develop "incentives for industry to get into the field," the Commission in

Executive Session on Community Policy, 81st Cong., 2d Sess. pt. 2, 39 (1950). It was estimated in 1949 that about 6,000 persons, or about nine per cent of their entire personnel, were assigned by contractors to guard duty and other aspects of security. See SEN. REP. No. 1169, 81st Cong., 1st Sess. 75 (1949).

124. SECOND SEMI-ANNUAL REPORT 1, 5, 6 (1947).

125. THIRD SEMI-ANNUAL REPORT 36 (1948). The section of the report from which the quotation was taken reads as follows:

"More than 3,000 contractors, sub-contractors, and suppliers are already taking part in the atomic energy program. Many more must be induced to participate—for unless the initiative, technical skill, and managerial ability of American business are brought to bear with maximum effect on the problems of atomic energy development, the people of the United States will not realize full benefits from this new field of endeavor. It is the policy of the Commission, subject to Congressional supervision as provided by the act, to move away from the present Government monopoly provided by law as rapidly as feasible having in mind the paramount consideration of the national security. The Industrial Advisory Group will explore opportunities for increased individual participation for profit and methods of developing incentives for industry to get into the field. The objectives are to:

"1. Utilize fully the Nation's industrial research and development capacity.

"2. Keep the industries directly concerned fully informed as to the developments in their fields within security limitations.

"3. Insure the opportunity for technical training in atomic energy of as large a part of American industry as possible in order to prepare the industrial community for the job it must do if America is to continue to be strong in atomic energy development."

October, 1947 set up an interim Industrial Advisory Group to study the problem and make recommendations.¹²⁶ In December of 1948, having examined secret data, consulted with many officials and contractors, and visited the Commission's major installations, the Advisory Group made its report. It was not a paean of praise. It noted that industry had been given an "important part in the program" but pointed out that this was confined to a narrow segment of contractors. The opportunity for general industrial participation was limited, said the report, to the development of radioisotopes, in itself not an area of opulent promise. The industrial advisors had a number of complaints relating to organization and similar matters, but the chief grievance was industry's lack of information as to where to look for a share of atomic energy profits. "It has been stated that industrial opportunities in atomic energy are potentially unlimited. But they are at present so shadowy that business men neither know where to look nor what to look for. Today no one can say whether the prospect of profits or other incentives exist, because under present conditions the great majority in industry knows little or nothing about the subject."¹²⁷

126. The members of this group are among the nation's leading industrialists. See e.g. THIRD SEMI-ANNUAL REPORT 45 (1948).

127. INDUSTRIAL ADVISORY GROUP, *op. cit. supra* note 25, at 6. A summary of the Report's conclusions and recommendations made these points:

1. While the contract system gives industry an important part in the program, the only opportunity now open to industry generally is in regard to radio-isotopes.

2. The Government should take the initiative in overcoming the restrictive effects of the Government monopoly, which is justified by security reasons only. A "greatly expanded industrial participation" is required to assure an optimum rate of technological advance.

3. A "vast amount of non-secret information of potential value to industry, is buried in the files and activities of the Commission." Industrial participation requires the publication in a form useful to industry of all non-secret information, and of all "properly declassifiable" information, "so that industry may recognize opportunities . . . as they arise."

4. Besides changing publication policy, the Commission should take the lead in providing for clearance of engineers, technologists, etc. so that industrial personnel can keep in touch with atomic energy as they do with other fields. In developing this clearance program, engineering and scientific societies should be consulted.

5. Another avenue to industrial participation would be the establishment of a General Industrial Advisory Committee, with sub-committees to work on specific problems. These would also benefit the Commission.

6. There is room for improvement in other areas of the Commission's relations with industry: to acquaint industry of the specific changes it is making in the contract system; further reports on the patent situation; to clearly distinguish the roles of scientists and engineer-contractors in regard to future research and development contracts; and further improvements in the Commission's own form of organization.

7. "The Commission's recent reorganization of staff is . . . a forward step . . . but does not go far enough. . . ." The organization set-up is still too much determined by mere geography; if the operations were put on more of a "functional basis," lines of responsibility would be sharpened.

In part this uncertainty reflected the uncertainties of the field of atomic energy itself; in part, however, it was due to the Commission's tight security controls which barred all but a small circle of contractors from access to technical information. The Commission repeatedly lamented the fact that it had a hard time finding contractors to take on jobs: indeed it justified various fees and other incentives (as well as its policy of "negotiating" contracts with selected firms instead of resorting to competitive bidding) on the ground that major industrial companies were reluctant to participate in the program; on the other hand it seems clear that one had to be *in* the business to gain any definite and useful notion of the opportunities it offered. Whether the Commission, imbued with the philosophy of grooming private enterprise as its successor, could in fact have broadened its contract base so as to promote industrial participation in the fullest sense, is a question we shall consider further on. For the moment it is desirable to take note of the fact that the contract policy actually adopted is one of concentration.¹²⁸ "Moving away from the present government monopoly" has in the Commission's lexicon meant one thing only—moving steadily toward a private managerial monopoly. This can scarcely be what Congress had in mind when it wrote the provision of the Act that refers to "strengthening free competition in private enterprise," although it is from this provision that the Commission claims to derive authority and guidance for this phase of its policies.

The Commission, on its own initiative and spurred by criticism, has volubly defended the twin tenets of its operating policy: delegation of management to contractor operators and concentration of contracts among a few large companies. It has availed itself of many methods of expressing its views: Congressional reports, testimony at Congressional hearings, press releases and press seminars, speeches by individual Commissioners, inspired articles in newspapers and magazines. The arguments advanced by AEC make the following points:

(1) The main objective of weapon production can best be promoted by making full use of the "technical and administrative talents of a broad sector of the American economy."¹²⁹

(2) Operation of plants and laboratories through independent contractors "not only gives to the atomic energy program substantial benefits from accumulated experience and established facilities; it also enlists the interest and support of industry and universities for future private development."¹³⁰

128. The details are to be found in the discussion beginning on p. 1332; also see Appendix Tables I-III.

129. Carroll L. Wilson, *Hearings before the Joint Committee on Atomic Energy on Los Alamos Retrocession Bill and AEC Contract Policy*, 81st Cong., 1st Sess. 47 *et seq.* (1949).

130. *Ibid.*

(3) Contractor operations are likely to be more efficient than government run operations for several reasons:

(a) The principal production processes are in the hands of contractors uniquely experienced in the field.

(b) Projects run for the government under private contract are not subject to various hampering restrictions which extend to the government acting as entrepreneur and employer.¹³¹

(c) Under profit incentives—whenever contracts can be used in which these are present—operating economies will be achieved more readily than in government run plants.

(4) The trend towards big government, an evil in itself, can be mitigated by delegation of powers; by enlisting private groups—even though under government supervision—to perform functions which would otherwise have to be exercised by the state.¹³² This argument, it may be observed, is an essential element of Lilienthal's oft repeated philosophy of government decentralization.

(5) The technical and engineering competence demanded by the atomic energy program, as well as its exceptional security requirements, necessarily limit the number of qualified contractors to whom the Commission can turn for managerial tasks. Only a few industrial firms are eligible; to induce their participation every possible concession must be made, including the grant to the contractor of virtual independence in running his program.

In a less precise but no less effective idiom these same arguments were expressed by Lilienthal on numerous occasions over several years. It is to the utterances of this enigmatic and contradictory figure that the student of atomic energy affairs must turn for close insight not only into the meaning of Commission policies but of how they evolved. For three years titular head of the Commission; and, more important, the forceful politician who led its thinking and steered its path, Lilienthal may properly be regarded as uniquely responsible for the contours of its contract and labor policies. Before the Senate Committee which considered his confirmation, Lilienthal committed himself unequivocally to the principle of private management of atomic energy plants. In numerous public statements that followed he reaffirmed and amplified this position. A noteworthy summing up of his theory of AEC—industry relations was again presented to Congress in 1949, on the occasion of the Hickenlooper charges.

"Our view has been from the very outset," he told the Joint Committee on Atomic Energy, "that there are two things to avoid in this very complex

131. DAHL & BROWN, *op. cit. supra*, note 30, at 66.

132. For example, see *Ibid.*

undertaking. That it is owned by the Government of the United States is inevitable. If there had been any alternative, I am sure the members of the Special Committee would certainly have recommended such an alternative. I think we are all resigned to this. But there is an alternative to direct Government operation. This is the thing we feel strongly—I feel as strongly as anyone could—should be avoided. That the thing to do is not to have the Government operate these industrial type activities directly, but to get the best industrial talent the country can afford, which is willing to accept and to live under the conditions under which this enterprise presently lives and, perhaps, most of us live.”¹³³

Turning then to criticism that had been uttered as to the Commission's administrative policy under which management and construction contractors are given wide latitude and considerable independence in the performance of their contract, Lilienthal continued:

“One of the great differentials this country has over the rest of the world is in the existence of just such companies as this, [General Electric, operator of Hanford] and I could name a number of others, and some of them are contractors of this Commission. ‘Contractor’ is not the word; they are partners, they are operators. ‘Contractor’ assumes that there is a specific job, like the building of a bridge, like the building of a line of railroad or highway from A to B, something that can be begun at a certain day; when it is through you can pay for it, and that is the end of the relationship.

“But here is something that is dynamic and growing if it is to be useful in a new technology, so that the word ‘contractor’ is hardly the word.

“What we are trying to do, members of the Committee, is to develop a new kind of set-up in American industrial affairs which is a hybrid of public and private; [author's italics] and a hybrid of this kind is only good if the public does not sit on the necks of the private or the private is completely unaware of its public responsibilities. Now the other alternative . . . is to pile on top of the industrial operator another set of managers, that is, that

133. *Hearings before the Joint Committee on Atomic Energy on Investigation into the United States Atomic Energy Project* 81st Cong., 1st Sess. pt. 8, 338 (1949).

Consider, however, Senator Hickenlooper's interpretation of Lilienthal's views as reported by Defense Secretary Forrestal. At a lunch in February, 1948, the Senator stated he had “rather vague misgivings” as to AEC and its activities: “he could put his finger on no one action or policy, but said that the character and number of speeches which Lilienthal was making, the emphasis upon the future possibilities of atomic power as a source of energy for industrial and general purposes, and his constant reference to control of atomic energy by ‘the people,’ all made a pattern with ultimate indicated objectives as follows: (1) The indispensability and therefore the perpetuation of Mr. Lilienthal in power; (2) the general underlying idea of statism.” MILLIS & DUFFIELD, *THE FORRESTAL DIARIES* 379 (1951).

the government should supervise in such detail that every important step taken by the operator should be checked and rechecked and double checked and triple checked by a group of government supervisors. This we do not believe is right.

"I do not want to cast any reflection on the field of regulation unnecessarily, but I think to a considerable extent what has happened to the railroad industry of this country is an example of what not to do, because in the railroad industry we have regulation carried to such detail that in many respects there is a second set of managers in the form of the regulators."¹³⁴

In his book *This I do Believe*, published in 1949, Lilienthal declared that if the nation was to have the strongest kind of atomic industry, "that industry must, like our other great industries, be the product of the talents and efforts of a wide sector of the people. We should not at our peril downgrade the role which private industry must play as a *co-trustee* with the Commission in this development."¹³⁵ A year later Lilienthal went far beyond that position in a magazine article calling for the end of Government monopoly and the turning over of the "industrial atom" to private industry.¹³⁶

This, then, was the philosophy which guided the Commission in establishing its organization structure, in formulating its contract and labor policies, in conducting its immense program of construction, manufacture, weaponeering, research, and community management. It was a philosophy of government administration enunciated by Lilienthal from the very beginning of his connection with atomic energy affairs; (although partly foreshadowed in the "decentralization" policies instituted at TVA)¹³⁷; endorsed in public statements by the other Commissioners and in AEC reports to Congress; reaffirmed throughout the Commission's record of operations. One can only wonder at the alarm expressed by Senator Taft during the 1947 confirmation debate in the Senate that Lilienthal was bent on socializing the atomic energy business¹³⁸ and at the later intimations by members of the Joint Committee in 1949 that the Commission was "throttling" private enterprise in its communities at Oak Ridge, Richland and Los Alamos.

134. *Ibid.*

135. LILIENTHAL, *THIS I DO BELIEVE* 130 (1941).

136. Lilienthal, *Free the Atom*, *Collier's*, June 17, 1950.

137. See, for example, *TVA: DEMOCRACY ON THE MARCH* (1945); also Lilienthal, "*The TVA: A Step Toward Decentralization*," an address before the University of California, Berkeley, Calif., Nov. 29, 1940 (mimeo.); SELZNICK, *TVA AND THE GRASS ROOTS* 60 *et seq.*, 75 *et seq.* (1949).

138. 93 CONG. REC. 3022 (1947).

SECTION THREE: AEC PRODUCTION CONTRACTS

I. NATURE OF THE CONTRACTS

The details of AEC contracts are in large part inaccessible to public inspection, but the general form of the contracts has been made known and certain other data have emerged in appropriations hearings before Congressional Committees.

In a statement furnished the Joint Committee by the Commission in 1948 there appears a useful summary of the major provisions of AEC contracts for the operation and construction of research and production facilities at Oak Ridge, Hanford, Los Alamos and elsewhere.

The principal points to be got from this summary are:

(a) The cost and cost plus fixed fee contracts¹³⁹ provide for "reimbursement by the Commission of the contractor's total costs, direct and indirect." The contract usually lists a number of specified reimbursable costs including materials, equipment, services, and labor; in addition it provides for reimbursement to the contractor of a share of "home office overhead" expenses that may properly be allocated to the contract in the field. Provisions also are made for unforeseeable contingencies, the prime contracts usually containing indemnity clauses against unexpected liabilities and expenses incurred in good faith. In the case of cost-plus fixed fee contracts, the amount of the fee does not vary with expenditures, although the original estimate of the dollar value of the work is "one of the factors taken into account in establishing the fee" initially. In the case of contracts calling for overhead payments, any excess over actual overhead expenses must be returned to the Commission.

(b) A substantial part of the work done at the various installations is under sub-contract.¹⁴⁰ Sub-contracts may be on a cost-plus-fixed-fee, lump-sum or

139. "A cost-plus-a-fixed-fee contract provides for the payment of all the contractor's allowable costs as defined in the contract; it establishes an estimate of the total costs; it provides for the payment of a fixed fee which does not vary with the actual cost, but is adjusted only in the event a material change in scope or character of the work is ordered by the owner."

Definition of Cost-Plus-A-Fixed-Fee Contract, UNITED STATES ATOMIC ENERGY COMMISSION, A GUIDE FOR CONTRACTING OF CONSTRUCTION AND RELATED ENGINEERING SERVICES 7-8 (1949).

140. Every management contract contains provisions "prohibiting the contractor with the Commission from subcontracting any part of the work he is obligated to perform under the contract, except as authorized by the Commission." Section 4(c)(2)(A).

In early drafts of the McMahon-Douglas bill, subcontracting of management contracts was prohibited. It was argued that subcontracting raised practical problems of administration and would make a nightmare of security. Safeguards against unauthorized disclosure of technical data about production processes are maintained with difficulty in huge plants employing thousands, even when the facilities are few and concentrated in only

unit-price basis, the cost-plus category predominating.¹⁴¹

(c) Managerial responsibility rests with the contractor who obtains labor and materials and plans the schedules of work. All contracts contain clauses providing that the contractor shall observe the Commission's security regulations and shall not grant access to restricted data to any person until after he has undergone FBI investigation and has been given security clearance by the Commission.

half a dozen locations. But when subcontracting scatters the work across the country and involves the participation of hundreds of shops, factories and laboratories having no direct responsibility to the Commission, the task of enforcement threatens to become impossible. Health and safety regulations may be similarly jeopardized by this farming-out process.

However, the Commission has accepted the practice, and has permitted its contractors considerable leeway in subcontracting certain parts of prime contracts. Thus, sampling only the more recent data, from January through June 1950, 118,646 subcontracts and contractor purchase orders were let totalling \$94,964,000. 40% of these orders and contracts were under \$25,000; 11% lay between, \$25,000 and \$100,000; 13% between \$100,000 and \$500,000; 35% were above \$500,000. From July through December, 1950, 135,508 subcontracts and purchase orders came to \$232,822,000. 27% were under \$25,000; 9% fell between \$25,000 and \$100,000; 13% ranged from \$100,000 to \$500,000; 5% were above \$500,000. Subcontracting has been confined for the most part to construction, architect-engineering and procurement contracts; and the concentration of the largest prime contracts among a small number of firms has had its counterpart, although to less extent, in the field of subcontracting. See Appendix Tables I-III. Prime contracts usually contain provisions as to the scope of subcontracts, and related matters. (For an account of regional office practices on subcontracting see testimony of Wilbur E. Kelley, Manager, N. Y. Operations Office, AEC. *Hearings before the Joint Committee on Atomic Energy on Los Alamos Retrocession Bills and AEC Contract Policy* 81st Cong., 1st Sess. 85 *et seq.* (1949)). But in any case the statute makes mandatory the review of all such arrangements. The Commission formally has expressed preference for the performance by a contractor's "own forces of all work except specialty items normally subcontracted." UNITED STATES ATOMIC ENERGY COMMISSION, A GUIDE FOR CONTRACTING OF CONSTRUCTION AND RELATED ENGINEERING SERVICES 9, 11(1951). The field office responsible for a given contract analyzes the proposed allocations "to determine whether the subcontracting of the work is in the best interests of the Commission," or whether it might be more advantageous to have the work done under a separate prime contract. *Hearings, supra*, at 85.

When the prime contract is of the lump-sum or unit price type and is awarded after advertising and competitive bidding, the subcontracts may be distributed to the same desirable procedure. This is, presumably, for the prime's decision and it can be reasonably anticipated that the competitive method will save him money. But when the prime contract is cost-plus-fixed-fee, its subcontracts, for security or other reasons, are often also negotiated. In those cases the disadvantages to the public interest characteristic of the prime contract are transmitted to its progeny. Cost-plus subcontractors, having no incentive to operate prudently, may compound the economic weaknesses of this type of contract. And even though the AEC, through its operation offices, approves all subcontracts, it is clear that on work where advertising is forbidden prime contractors enjoy great influence in the selection. Most prime contractors prefer to shop where they have done business before and thus the pattern of concentration tends to persist.

141. For definitions of lump-sum and unit price contracts see p. 1335; for a statistical breakdown of contract awards, by types, see Appendix Tables I-III.

(d) The contract usually provides that the Commission approve all sub-contracts, all major construction work to be carried out in fulfilling the contract and the contractor's wage and salary schedules.

(e) "In the administration of these contract provisions, it is not the policy of the Commission to superimpose its judgment on that of the contractor. The Commission normally relies very heavily upon the contractor's own judgment in these matters and normally approves expenditures and wage and salary schedules which are in line with the contractor's usual business practices and personnel policies."¹⁴²

By far the most detailed analysis of the types of contract in use, and their administration, is to be found in the Commission's Ninth Semiannual Report, dated Jan. 31, 1951. Evidently stung by Congressional criticism of numerous aspects of its contract policy, some of which criticism we shall review below, the Commission in this report presented a *catalogue raisonné* of the many different kinds of relationship with various contractors, a justification of each of the principal contract methods employed, a description of finance and accounting procedures, an outline of contractor-labor relations. The report is couched in the usual jargon and unfortunately fails to provide the statistical data that are needed to substantiate its general statements. These shortcomings diminish considerably the value of the report to the serious student; nevertheless, this digest of contract policies is the only recent official source available and therefore deserves careful attention.

142. The pertinent sections of the summary quoted in the text contain the following points:

The AEC's prime contracts are negotiated on a cost or cost-plus-fixed-fee basis; and subcontractors are sometimes awarded the latter type. The fixed fee is payable monthly, and does not vary with expenditures, although the estimated dollar volume is considered in first establishing the amount of the fee (which does change with drastic changes in the scope of the work).

These contracts normally specify the costs to be reimbursed, including part of the contractor's home-office overhead. The prime contracts also contain "unforeseeable contingency" indemnity clauses, where these seem appropriate. The contractor's relevant records are open to the Commission and the General Accounting Office, which audit all reimbursable costs.

While the details of the program described generally in the contract are worked out mutually, the contractor rather than the Commission bears "the managerial responsibility." The contracts all contain comprehensive security clauses: some also give the Commission the right to pass on the desirability of the contractor's key personnel.

Some expenses and commitments require approval by the Commission. These normally include: subcontracts; major construction; purchases in excess of a stated amount; wage schedules (including even welfare plans). When desirable, the Commission will furnish material and equipment directly: this right is reserved in the contract. The normal practice of the Commission is to rely "heavily upon the contractor's own judgment," interfering but seldom in the latter's ordinary business and personnel policies.

Hearings before the Joint Committee on Atomic Energy on Labor Policy in Atomic Energy Plants, 80th Cong., 2d Sess., p. 1, 137 (1948).

The Report speaks of three major types of contracts now in use: *Unit price, lump-sum, and cost.*

Unit-price contracts are employed "in purchasing supplies, materials, equipment, and other items."¹⁴³ Contracts of this type "may be either negotiated, as in the production of feed materials, or let after advertising under full competitive conditions, as in the case of drilling and mapping operations."¹⁴⁴ In the few instances where contracts are let competitively, the contractors "eligible" to bid are previously "selected" on the basis of AEC "screening," including—where restricted data are involved—investigation by the FBI.

"*Lump-sum contracts*, under which a concern agrees to do a job for a fixed price, have been used by AEC principally for construction work." (They may also be used for architect—engineering and other service and supply contracts.) Contracts of this kind may be let through full advertising and competitive bids; "when advertising is not practicable, a selected group of contractors is usually invited to submit competitive bids."¹⁴⁵ The Commission has also used lump-sum contracts "to promote basic research, in university and private nonprofit laboratories in fields of special interest to the atomic energy program. Under these contracts the AEC typically contributed a negotiated fraction of the total costs of the project for carrying out a line of investigation for a specified length of time."

Cost contracts, with or without a fee negotiated at the time the contract is drawn, are used by the AEC "for operations in Government-owned plants, laboratories, and other facilities, for large development undertakings such as those for new kinds of nuclear reactors, and for particular construction

143. The source of this and other material on pp. 1315-55 is NINTH SEMIANNUAL REPORT, 39-88 (1951).

144. "The unit price includes costs and profit, and is a negotiated figure. As a guide, average cost and profits in similar industries are considered. . . . In a contract for new work since no actual costs are available, unit prices for the first quarter are necessarily estimates. At the end of a quarter of operation, the contractor submits his costs projected for the quarter ahead with explanations of price changes. An AEC auditor inspects his books and a general discussion is held on increases or reductions. The AEC then establishes a standard for negotiations in which all elements of the various items of cost are discussed individually before a price is agreed upon for the next quarter." *Id.*, at 45.

145. The language used at this point is so vague as to be almost meaningless. Even with AEC's Construction Contract Manual at his elbow "defining authority" and "detailing basic policies to be followed," the contracting officer, as events have repeatedly shown, is entirely free to dispense with advertising as "not practicable" and is indeed tempted to follow such a course for his own convenience. Note, moreover, that contractors are "usually," but by no means *always*, invited to submit competitive bids. The largest construction contracts have, in fact, been let without competitive bidding of any kind. To illustrate, of the contracts let by AEC in the period July through December 1950, 93.5% of all contracts, by *dollar* value, were negotiated, and only 6.5% awarded by the competitive method. (See for further details, Appendix Tables I-III).

jobs."¹⁴⁶ Large construction projects are invariably handled under a CPFF scheme. The architect-engineers, construction contractors and engineer-constructors are selected for the job by the manager of the AEC operations

146. The Act authorizes the Commission, when employing contractors, to make "partial and advance payments" for work to be done. Section 4(c)(2)(B).

This provision was intended to make practicable the use of long-term contracts advantageous especially in research and development and to facilitate the participation in AEC work of smaller industrial concerns whose limited capital would otherwise prevent them from undertaking a government assignment.

Partial and advance payments, it should also be observed, go hand in hand with cost-plus-fixed-fee contracts. The cost-plus contractor is in a sense in the position of having a drawing account to meet expenses as he goes along. In cases where partial and advance payments are permitted it is conventional government fiscal and accounting practice to reflect costs in the Government's accounts only when the contractor's expenditures have been audited and reimbursed by the Government. The Commission has found this method unsuited to its special requirements and has replaced it by a new system. See NINTH SEMIANNUAL REPORT 58 *et seq.* (1951); FIFTH SEMIANNUAL REPORT, 132 *et seq.* (1949).

Its main elements are these:

(1) Cost-type contractors are, for accounting purposes, treated as "operating affiliates" of the Commission, which is to say that their costs are considered "as incurred by the Government at the moment the contractors incur them, and the movement of cash between the Government and its contractors . . . (has) no more cost-accounting significance than the transfer of funds from one bank account to another." *Id.* at 133.

(2) Contracts, accounts and statements are subject to "periodic commercial-type audits [and] it becomes possible, under the new system, to adopt the accounting techniques of intercompany accounts and consolidated statements." The contractor is charged with funds, facilities, materials and manpower that have been provided; "customary asset, liability and operating accounts are maintained by contractors" and include the depreciation, repairs and maintenance costs for fixed assets furnished by the Government; from these are prepared the monthly financial cost statements used by AEC in making consolidated statements for the entire program. *Ibid.*; SIXTH SEMIANNUAL REPORT 140 (1949).

(3) The contractor receives a monthly cash advance to provide working funds for the ensuing month. (This method, it is said, makes it possible for him to operate "with a smaller working fund advance.") FIFTH SEMIANNUAL REPORT 133 (1949). "The contractor then submits reimbursement vouchers periodically which, instead of being supported by the conventional voluminous copies of vouchers and payrolls, merely refer to specific accounting records which are subjected to public accounting-type audit at the site by AEC auditors." SIXTH SEMIANNUAL REPORT 138 (1949); NINTH SEMIANNUAL REPORT 39 (1951). The Commission has reported that these procedures are acceptable to industrial contractors, because they are patterned after those generally used in industry." FIFTH SEMIANNUAL REPORT 133-4 (1949). University contractors had "some difficulty in adopting them because their background and usual requirements are different; but rapid strides are now (Jan. 1949) being made in introducing the procedure among the institutional contractors." *Ibid.* (For an excellent summary of this accounting and financial system see NINTH SEMIANNUAL REPORT 59-60 (1951)).

Reporting on its fiscal and accounting system in 1951, the AEC conceded that only the largest contracts for operational management, construction and development had been

office concerned; the panel from which selection is made must be approved in advance by the director of the Division of Production in Washington; a local Contract board attached to the operations office "is responsible among other functions for recommending selection of contractors." Subcontracting is handled by the various primes "in accordance with AEC standards and with AEC review for approval before the subcontract (is) . . . signed."¹⁴⁷

In the case of large research and development projects, AEC "generally reimburses the contractor for his direct costs plus an overhead allowance, and in some instances pays a fixed fee." Under this heading come work on the design of a new reactor, "general studies as, for example, development of heat transfer systems, or investigations into new and better methods of extracting uranium from ores." Subcontracting of CPFF research and development contracts may, in turn, be let on a lump-sum or on a cost basis, at the prime's discretion where "complicated and novel manufactured items" are required. The Commission's Report directs attention to the fact that a cost-contractor, or sub-contractor may use for AEC jobs articles which he himself manufactures, in which case "these articles cannot be charged to the AEC at prices higher than those currently paid by any other customer buying substantially the same quantities."¹⁴⁸

All major production plants or laboratories, and the communities associated with them, are privately operated for the Commission under cost contracts. In many instances the contracts in force "evolved from contracts originally worked out by the Manhattan Engineer District."¹⁴⁹ General Electric under a cost contract operates the Hanford complex (including construction), the supporting Richland community, and Knolls Atomic Power Laboratory; Union Carbide and Carbon Corporation under the same type of contract runs the Oak Ridge gaseous diffusion plant and the Oak Ridge National Laboratory

"integrated" in this way. "Even some large cost-type contracts, because of their limited duration, are not accounted for on an integrated basis. In such cases, the AEC reviews the contractor's accounting procedure in advance to assure that they will provide the cost data necessary for the maintenance of AEC accounts. *Id.* at 60.

The extent to which advance and partial payment authorization has helped smaller industrial concerns to take part in the program is difficult to ascertain. It seems safe to conjecture, however, that they have benefited and that of the many thousands who have prime or sub-contract relations with the AEC, the great majority require and receive this form of financial assistance.

147. There is no fixed rule for determining which jobs are to be covered by AEC prime contracts, and which are to be subcontracted. "Timing," "economy," and "security of information" are among the factors suggested by the AEC as affecting the decision.

148. Perhaps the most interesting aspect of this safeguard is that it should have been thought necessary to write it into the contract. The Commission frequently asserts that a spirit of close partnership rather than mere commercial interest characterizes its relations with contractors; it is surprising, therefore, to learn that the possibility was anticipated that some of these "partners" might discriminate against the Commission when selling their own products to themselves as the AEC's agents.

149. NINTH SEMI-ANNUAL REPORT 53 (1951)

and takes over another such plant, when completed, at Paducah, Kentucky; cost contracts held by private concerns embrace the management of the towns of Oak Ridge and Los Alamos; the laboratories at Argonne, Los Alamos, Brookhaven are cost-operated by the Universities of Chicago, California, and by a group of nine eastern universities (Associated Universities, Inc.) respectively. In terms of dollar value, 90 per cent of all contracts let by AEC in the period July through December 1950 are of the CPFF type. The distribution is typical. University operators of AEC laboratories are not generally paid a fee; community contractors always are; certain plant contractors receive fees, others do not. Overhead allowances are fixed in almost every cost contract.¹⁵⁰

Cost contracts (with or without fee), constituting, in dollar value, as we have noted the overwhelming majority of work let,¹⁵¹ are almost exclusively "negotiated contracts." That is to say, the AEC having selected the contractor, agrees with him on the various details including fee, overhead and contingency clauses. The word "negotiated" distinguishes the contract from one which has been let after advertising and competitive bidding.¹⁵²

Fees are determined usually by the local manager of operations, with the advice of the contract board set up for his area.¹⁵³ Managers may turn for

150. See *e.g.*, Appendix Table III

"In the case of the corporations operating production installations, provision is made for home-office or off-site administrative charges over and above reimbursable on-site costs: sometimes by an administrative fund against which charges must be justified, sometimes as part of a fee, sometimes by an overhead allowance. Special risks arising out of the type of operation are chargeable to the Government, and the AEC indemnifies contractors by various devices and in varying degrees according to other arrangements for payment under the contract. Where a fee is paid, the contractor commonly stipulates the scope of operations anticipated, and a change in scope may entail negotiation of a new fee."

151. NINTH SEMIANNUAL REPORT 56 (1951). See Appendix Table III for tabulations of cost and cost-plus-fixed fee contracts.

152. Where no security factors are involved purchases may be governed by normal federal practices as to advertising and competitive bidding. But when in the opinion of the AEC contracting officer advertising for bids would infringe security or "impair efficiency" the practice has been to "select" the manufacturer or supplier after appropriate investigation and to "invite" him to make a secret lump-sum or unit price bid. In some instances a selected group of suppliers—also "cleared"—are asked to bid. Bids and awards are of course kept secret. A similar method is applied to engineering and construction contracts which may be let (a) on a cost-plus-fixed-fee basis, (b) on a lump sum (or unit price) basis with formal advertising, (c) by "invited bids and by negotiation" without formal advertising. See for example testimony of Wilbur Kelley, Manager N.Y. Operations Office, AEC, *Hearings before the Joint Committee on Atomic Energy on Los Alamos Retrocession Bill and AEC Contract Policy*, 81st Cong., 1st Sess. 75 *et seq.*, 81-8 (1949); also AEC CONTRACT MANUAL. (See note 154 *infra*). See Appendix Table III for data as to the distribution of contract by various methods of awards.

153. ATOMIC ENERGY COMMISSION CONTRACT MANUAL. This is in part a classified document, the unclassified portions of which are reprinted in *Hearings before the Joint Committee on Atomic Energy on Selection of Site for Reactor Test Station*, 81st Cong.,

advice to something referred to as a "fee book on the management problem," and again as a "fee manual"; but since this guide to the perplexed is not open to the ordinary student's gaze, it is possible only to conjecture as to the kind of information it contains.¹⁵⁴

Whether or not a cost contract includes a fee, it almost invariably provides for the payment of overhead expenses. For direct labor costs incurred by a contractor at his factory, there is granted a "factory overhead" allowance which, in some instances runs to more than 100 percent of the amount expended for labor. For costs incurred by a contractor in his home office, allocable to work done for AEC, a "general administrative overhead" allowance is provided.¹⁵⁵

This very brief outline of the main elements of AEC contracts must serve as introduction to the more critical evaluation in the sections to follow. It should be observed that the actual content of AEC contracts is withheld as strictly classified information, and that in attempting an analysis of the subject one is handicapped by the denial of access to many of the vital statistical data.

II. CRITICISM OF CONTRACT POLICY

There has been little serious evaluation, let alone criticism, of AEC contract policies either in political and economic journals or in the more popular magazines and the press. Evaluations of this kind require access to the pertinent facts, and these have flowed from the Commission, ostensibly because of security precautions, in no more than a trickle. Undoubtedly the Commission, harassed by Congress and assailed by other pressures, faces serious difficulties in attempting to work out a rational information program. Yet, there is reason to believe that AEC practice in withholding information in the province of contract relations, as elsewhere, has sometimes served political and administrative ends—not the least being the deliberate concealment of internal inefficiency, official misjudgments and blunders. Despite the scarcity of the data brought to public notice by the Commission, a considerable amount of illuminating information is to be found in AEC Congressional hearings—before the Joint Committee and the Appropriations Committees of the House and Senate. Congressional criticism of the AEC has, to be sure, often been partisan and of uneven merit. The Hickenlooper charges were in large part picayune, con-

1st Sess. 147 *et seq.* (1949). The sections of the Contract Manual pertaining to fees on cost-plus-a-fixed-fee contracts, and procedure in negotiating contracts, among others, are withheld for "administrative" reasons.

154. See for example the testimony of Carroll L. Tyler, Manager, Santa Fe Operations Office, Los Alamos (AEC); *id.* at 655-9. Also testimony of Carleton Shugg, Deputy General Manager, AEC, *Hearings before the Subcommittee of the Committee on Appropriations, House of Representatives, on Second Supplemental Appropriation Bill for 1951*, 81st Cong., 2d Sess. 219 *et seq.* (1950).

155. See for example note 170 *infra*.

fused, frivolous and, in not a few instances, outright humbug. Nevertheless, even during these hearings valuable matter was brought to light; and other testimony before Congressional Committees has helped considerably towards comprehension of what AEC has done, and especially of the broad implications of its policies and practices.

Congressional hearings, in their more fruitful phases, have developed a number of themes. The abler and more persistent Committee members have returned repeatedly to the following matters: economy of operations; types of contract; decentralization of responsibility and degree of authority granted field officers and contractors; extent of knowledge enjoyed, and measures of control applied, by the Commission with respect to major decisions and expenditures; diversification of contract awards; quality of information presented to Congress by AEC on budget questions and the like; security, secrecy and loyalty issues; community management. A closer examination of only some of these matters can be undertaken below.

While the Commission's general policy of private operation of its plants has had the approval of Congress, the *type* of contract it employs has been frequently criticized on the grounds that cost-plus fixed fee contracts do not encourage economic operation, that the policy of giving contractors comparatively free rein deprives the Commission of adequate control over the expenditure of government funds and that "overhead" provisions produce covert profits under the guise of reimbursement for expenses.

AEC contracts, it was pointed out in numerous Congressional hearings in 1949,¹⁵⁶ are open to essentially the same objections that were urged against cost-plus contracts during World War II.¹⁵⁷

156. See *Hearings before the Joint Committee on Atomic Energy on Los Alamos Retrocession Bill and AEC Contract Policy*, 81st Cong., 1st Sess. 35-94 (1949); also *Hearings before the Joint Committee on Atomic Energy on Investigation into the United States Atomic Energy Project*, 81st Cong., 1st Sess. *passim* (1949).

157. The general subject of cost-plus-fixed-fee (CPFF) contracts has been treated in the literature of economics and government administration and lies outside the province of this study. Nevertheless a summary of a few of the highlights of this highly controversial method of government contracting may be helpful as background for the discussion of AEC policies. For the material given below free use has been made of MILLER, *PRICING OF MILITARY PROCUREMENTS* (1949), especially pp. 124-33, and of various War and Navy Department historical documents cited therein (e.g. PRODUCTION AND PURCHASES DIVISION, *ASF PURCHASING POLICIES AND PRACTICES*.)

1. Both CPFF and CPPC (cost-plus-percentage-of-cost) contracts were widely used by the Government in World War I. "But the CPPC contract was held responsible for much of the inefficiency and profiteering of that war and was consequently forbidden as early as May, 1918." MILLER, *op. cit. supra*, at 124.

2. The military-procurement enabling legislation adopted by Congress in 1940, and other related acts prohibited the use of CPPC contracts, from the beginning of the last war, but permitted the use of CPFF contracts. (See for example: Pub. L. No. 671, 76th Congress, 3rd Session, (June 28, 1940), 54 STAT. 676; Naval Appropriation Act of 1941, (June 11, 1940), 54 STAT. 297; Military Establishment Appropriation Act of 1941, (June 3, 1940), 54 STAT. 352; National Defense Supplemental Appropriation

As early as August 1941, the Special Senate Committee Investigating the National Defense Program, under the chairmanship of the then Senator, Harry S. Truman, was outspoken in its censure of the cost-plus-fixed-fee contracts negotiated by the Army for the construction of war cantonments. In its report, the Committee said:

"The Committee believes that lump-sum contracts should be used whenever possible, for the reason that contractors and architect-engineers would be much quicker to stamp out inefficiency and to hold costs down where they would be sustaining the loss. The cost-plus-fixed-fee contract is not as bad as the cost-plus-fixed percentage contract which was used in the last war. It has been aptly said that in the last war the contractor had to work to make the costs even more excessive than they would otherwise have been in order to get his large fee. In the present case, we have improved it so that now it can be said that the contractor need do nothing to get his fee. If progress is slow, the contractor can simply order in more equipment, hire more men and use overtime at Government expense in order to bring the progress rate up. Such action

Act, (June 26, 1940), Title II, 54 STAT. 603; Pub. L. No. 730, 76th Congress, 3rd Session, (July 2, 1940), 54 STAT. 712).

3. The fee on CPFF contracts generally did not (during the war) exceed seven per cent of the contract costs; it is sometimes supplemented by a bonus if costs are cut below the estimate or if delivery schedules are exceeded. Costs are usually reviewed by the Government's contracting officer and by the General Accounting Office. "The danger that expenditures will be disallowed by the Comptroller General even after approval (by the services) constitutes one of the principal risks of this contract form." MILLER, *op. cit. supra*, at 126.

4. The services have made wide use of CPFF contracts for construction and "for large production contracts, especially in the case of ships, aircraft and ordnance." *Ibid.* Between 1940 and 1944, CPFF contracts represented 30 per cent of the total number of procurement contracts of \$10 million and over.

5. Congress has never looked with favor on CPFF contracts, the principal criticism being that they "fail to provide incentives to productive efficiency." *Id.* at 129. The reasons advanced for their use include the need for speed in procurement, uncertainty of specifications (especially in research and development contracts), risk to the contractor "resulting from the large size of his contracts in relation to his capital." *Id.* at 128. (The same arguments, it will be noted, have been advanced by AEC officials). Government owned, contractor-operated war plants were almost invariably operated under CPFF arrangements—a model, therefore, for the Manhattan Engineer District and a precedent for the AEC.

6. Miller points out that the CPFF contract "provided an incentive to keep up costs on one contract in order to establish higher estimated costs and therefore higher fees on subsequent contracts." Yet he concedes that "the merits of the argument that CPFF contracts are conducive to inefficiency are by no means established The available evidence on the matter is not conclusive." *Id.* at 129-30, 132.

is, of course, much easier than to increase efficiency and there is no penalty whatever therefor. . . ."¹⁵⁸

Ample evidence that the abuses cited by the Truman Committee had again arisen in the performance of certain AEC contracts was gathered by Congressional investigators.

A striking though not necessarily the most costly instance of waste under a cost-plus-fixed-fee contract, was that of the Hanford "overrun," which was the basis of one of the counts in Senator Hickenlooper's mismanagement charges against Lilienthal in 1949. It was disclosed that a contract which had been let for the erection of a "plutonium fabrication facility" on the basis of an estimated cost of \$6,255,000 was completed only after an expenditure of approximately \$25,000,000.¹⁵⁹ Although both Lilienthal and a high official of General Electric, the prime contractor, attempted partially to justify this extraordinary increase, the explanations struck many observers as bespeaking considerable confusion and laxity both by the Commission and the contractor. Certainly one may doubt that so large an overrun would have been permitted by General Electric and its Hanford executives had the company not been operating on a reimbursable cost basis.¹⁶⁰

158. *Investigation of the National Defense Program*, SEN. REP. NO. 480, 77th Cong., 1st Sess. pt. 2 (1941). It should be remarked that federal law continues specifically to prohibit cost-plus-fixed-percentage contracts for government work. See Armed Forces Procurement Act, 41 U.S.C. § 5 (Supp. 1949).

159. For two years the "estimated cost" of the installation so far as the General Manager's office knew—or at least alleged to know—fluctuated between \$6 million and \$9 million; when suddenly in early 1949 the Commission, through a routine inspection by one of its members, discovered that in reality "234-5," as the facility was known, would cost about \$25 million. "It was during the latter half of 1948 that the estimate increased almost 300 per cent without the knowledge of the five Commissioners." SEN. REP. NO. 1169, 81st Cong., 1st Sess. 16-17 (1949).

160. Lilienthal told the Committee that since it was necessary for military reasons to build the plant in great haste the contractor had been under pressure by the Commission to proceed as rapidly as possible; that there had been changes in design because of advances in technical knowledge and that the plant had to be ready "as far in advance as possible" of bomb tests to be made at Eniwetok to take advantage of the results of the tests in the "refabrication" of weapon components. (The latter statement is unclear. Why would it not have sufficed for the plant to be ready when the tests had ended?) Harry A. Winne, vice-president of General Electric told the Committee that the plutonium fabrication plant had been started about six months earlier than had first been thought possible, so great was the sense of urgency at the time; that it had been impossible to give firm cost estimates because of necessary changes in design as the work proceeded; that the facility required the installation of unusual safety devices which, moreover, had to be modified as new knowledge was gained in the field of health and safety. His most telling point was that it was unjust to single out the one plant on which there had been a large overrun since this plant was only one element in a large construction program of 235 million dollars, the overrun on which was only three per cent. A later statement by General Electric estimated that the total overrun on 57 major construction projects would be less than one per cent. (See *Hearings before the Joint Committee on Atomic Energy on Investigation into the United States Atomic Energy Project*, 81st Cong., 1st Sess. pt. 8, 329 *et seq.* (1949)).

The Hanford case, it should be noted, also raised the issue of loss of efficiency and control due to decentralization. It turned out that the Commissioners were wholly ignorant of the 300 percent rise in costs.¹⁶¹ The Joint Committee, although accepting the explanations that the increased costs were caused largely by the speed with which the work had to be done and by changes made in the plans to incorporate new production techniques, commented sharply that "no extenuating testimony can gloss over the fact . . . that the Commission did not grasp the situation until far more than a reasonable time had elapsed."¹⁶²

In its 1949 report, the Joint Committee offered a general comment on contracts which echoed with cautious reservations the findings of the Truman committee eight years earlier :

"Only a lump-sum unit-price, or similar-type contract, offering maximum opportunities for profit, creates highest incentive to keep down costs. This system has been applied successfully in the case of certain feed material processes; but whether it might work in the operations at Oak Ridge, Hanford, and Los Alamos is a difficult question which the Commission must face at some time in the future."¹⁶³

AEC officials appearing before Congressional Committees always come prepared with a formidable set of arguments to support their contract policies. National security and urgent military requirements; the need for secrecy; technical difficulties in plant operation, engineering and construction and the unique industrial "know-how" required to overcome them; the "sacrifices" entailed in taking on atomic energy assignments and the contractors' reluctance to do so unless special privileges and exemptions are granted: these are among the justifications offered for many AEC contract practices—practices, it may be observed, that in peacetime are forbidden to other federal agencies, even the Defense Department.¹⁶⁴ The Joint Committee has, on the whole, been impressed by the reasons given by the AEC; the House Appropriations Committee, presumably imbued with no parental concern for the AEC has shown itself to be more skeptical.

Repeatedly Commission witnesses have assured the House Committee that, in construction work at least, an increasing number of contracts would be let

161. The report bleakly concedes, "There seems to have been no clear understanding either in the General Electric Co., or at the AEC as to whose responsibility it was to follow the cost." SEN. REP. No. 1169, 81st Cong., 1st Sess., 17 (1949).

162. *Id.* at 18.

163. *Id.* at 20.

164. See for example the colloquy between Congressman Case of South Dakota and Carleton Shugg, AEC, Deputy General Manager, discussing contract practices of the Army Corps of Engineers: *Hearings before a Subcommittee of the Committee on Appropriations, House of Representatives, on Urgent Deficiency Appropriation Bill, 1950* 81st Cong., 2d Sess. 63-4 (1950).

by competitive bidding on a lump sum basis. Repeatedly the members of the Committee have demanded proof that this method has actually been adopted in earnest; repeatedly explanations and excuses for failure to live up to the assurances have been forthcoming. The following sharp exchange between the Chairman of a House Appropriations Subcommittee and certain AEC officials took place in 1950; it is enlightening as to issues and attitudes.¹⁶⁵

Congressman Thomas: "What I am getting at is this: The Committee's investigators complain at some length about the way the Commission is letting contracts on a cost-plus-fixed-fee basis. We have been told here time and time and time again that the vast majority of your construction work was done on open competitive bidding, and the investigators came back with a report that practically very little of your work is done in that manner.

"The Committee is considering putting a limitation on this \$188,000,000 program [a construction program] requiring you to let this work by open competitive bidding. That is the reason I ask you how much of it has already been spent; how much of it, in other words, has already been completed. . . .

"Is there any good reason why a limitation could not be put on this fund and all of your future funds requiring you to go back to open competitive bidding?"

Mr. Williams: (Director of the Division of Production) "If you are not interested in getting it done in a given time, we can do it that way."

Mr. Thomas: "What we are interested in is in saving the taxpayers some money and seeing that you do your job right. We do not want to hurt you; we do not want to cripple you."

Mr. Shugg: (Deputy General Manager) "If we do that, that would hurt and cripple us, and we cannot meet the goals laid down."

Mr. Thomas: "I do not know how it is going to cripple you. You testified here that you have made the plans, and the fact is that these projects sometimes take two or three years, and then you change what you have. Where is that going to cripple you or hurt you."

(Shugg then argued that competitive bidding would necessitate sending out detailed plans, that the interested bidders would have to undergo security clearance, all of which would cause delay. Thomas suggested that competitive bidding merely added to the clearance load a handful of officials representing the various companies participating in the bidding; that the major clearance burden for 10 or 15 thousand construction employees would be the same whether the contractor had been hand-picked—"one of your 'favorite' contractors," as he phrased it—or had been awarded the job as a result of competitive bidding.¹⁶⁶ He suggested, further, that a lump-sum contract would save "at least 25 percent" on a new plant and that it would also save time, because "the man who is sitting over there with a cost-plus-

165. *Id.* at 37 *et seq.*

166. See also, on the question of the clearance load, the comments of Congressman Phillips of California. *Id.* at 50.

fixed-fee contract . . . has no incentive to hurry up the job . . . [since] he is going to get more the longer he stays there." Williams protested that Thomas was oversimplifying the issue and the discussion continued:)

Mr. Thomas: "Well, you gentlemen give us the impression—you certainly give it to me—that you are not interested in saving a dime of the taxpayers' money by putting yourselves to a little more trouble or delaying yourselves 30 or 60 days, which may speed up in the long run 2 or 3 months. You are not interested in that."

Mr. Williams: "We have demonstrated by examples that we are interested in saving the Government money."

Mr. Thomas: "Where? Put your finger on one."

Mr. Williams: "We saved in the operation of the town [Oak Ridge] last year by cutting off people, by economies and more efficient operation, \$4,000,000."

Mr. Thomas: "You did not do that; this committee did it. It took us 3 years to do it for you. We asked you to do it for three long years, and you did not do it. Finally we did it for you."

Mr. Williams: "I do not recall that."

Mr. Thomas: "Do you want us to get out the hearing and read it to you, if your memory is a little short?"

Throughout other Congressional hearings and Committee reports are sounded the same or related forms of criticism: that "the cost-plus-basis is the most expensive method of operating"¹⁶⁷; that the private contractor's strongest motive for efficiency, viz., profits, is extinguished by the reimbursable cost-plus-fee arrangement; that the Commission is both extravagant and indifferent to the frequent admonitions by Congress to institute measures of economy. It has also been charged that prime contractors use the subcontracting device as a means of increasing their fee and that the AEC is careless in controlling such evasions and subterfuges.¹⁶⁸

The overhead provisions in AEC cost and cost-plus-fixed-fee contracts—alluded to earlier—also have evoked considerable disapprobation in Congress

167. "The contractor supplies no funds and consequently assumes no risk in his operations under . . ." Independent Offices Appropriation Bill, 1950. H. R. REP. NO. 425 81st Cong., 1st Sess. 8 (1949). See also Statement of Congressman Phillips of California, *id.* at 72; Colloquy between Mr. Lilienthal and Congressman Thomas: *Hearings before the Subcommittee of the Committee on Appropriations, House of Representatives, on the Independent Offices Appropriation Bill for 1950*, 81st Cong., 1st Sess. pt. 1, 1095-8 (1949).

168. "You had a major contractor who, in turn, let a whole series of subcontracts, and, in turn, put some of his personnel on the sub-contract pay roll at a very high salary, so that, in effect, he was increasing the fee, as far as profits on the base contract were concerned."

Statement by Congressman Case of South Dakota: *Hearings before a Subcommittee on Appropriations, House of Representatives, on Urgent Deficiency Appropriation Bill*, 1950 81st Cong., 2d Sess. 62 (1950). See also exchange between Mr. Case and Mr. Shugg, *id.* at 62-4.

and elsewhere.¹⁶⁹ An example of this arrangement is to be found in the Atomic Energy Commission 1949 contract with General Electric for the management of the Hanford plant and the Schenectady laboratory. The contractor, reimbursed for all costs and expenses, receives \$1 a year as a fee but he is also granted a "factory overhead" allowance ranging from 119 per cent to 142 per cent of direct labor costs, and a general "administrative" overhead of \$200,000 per month.¹⁷⁰ Members of Congress did not refrain from hinting unkindly that a profit lay hidden in this overhead, although admittedly not a huge one for a contract of such size. It was suggested further that the Contractor's performance did not warrant conferring such a benefit upon him.¹⁷¹ Contracts containing an overhead clause have been described as objectionable for the reason, among others, that they are ambiguous and convey a false impression to the public. As Senator Joseph C. O'Mahoney, chairman of the subcommittee of the Senate Committee on Appropriations observed tartly:

"May I say this from my own point of view, recognizing the great significance of the operation at Hanford and of the laboratory in Schenectady and the desirability of those and the absolute necessity that the Atomic Energy Commission have operators there who know what they are doing, I see no reason why the General Electric Company should not be compensated for operating the thing. But here, instead of a clear-cut compensation to the General Electric Company for doing a necessary public work under a contract with the Government agency, we are presented with what purports to be a cost plus

169. For examples of criticisms of this type of contract, see *Hearings before the Subcommittee of the Committee on Appropriations, United States Senate, on Independent Offices Appropriation Bill for 1950*, 81st Cong., 1st Sess. 1271 *et seq.* (1949). See also *Hearing before the Joint Committee on Atomic Energy on Investigation into the United States Atomic Energy Project*, 81st Cong., 1st Sess. pt. 8, 353-4 (1949).

170. An AEC witness, Mr. Shugg, pressed as to the exact meaning, in this contest, of "overhead" and as to how it was determined seemed unable to supply a particularly illuminating definition, but on the question of how the sum was fixed proffered the following: "I believe the determination is made by the Air Force in this case. . . . At the research laboratory, that is, General Electric's own research laboratory, the expense is 119 per cent of the direct labor cost. At the engineering and consulting laboratory the agreed on rate is 141 per cent of the direct labor cost. At the electrical department it is 132 per cent and at the chemical and other departments it is 142 per cent.

For the rest of this interesting encounter between Senator O'Mahoney and Mr. Shugg see, *Hearings before the Subcommittee of the Committee on Appropriations, United States Senate, on Independent Office Appropriations Bill for 1950*, 81st Cong., 1st Sess. 1271-2 (1949).

171. See colloquy between Congressman Thomas and General Manager Wilson in *Additional Hearings before the Subcommittee of the Committee on Appropriations, House of Representatives, on the Independent Offices Appropriations Bill for 1950*, 81st Cong., 1st Sess. 13 (1949).

a fixed fee of \$1 and then we run across this overhead expenditure, the details of which nobody seems to be able to give us.”¹⁷²

An official of General Electric testifying before the Joint Committee denied that the overhead payment could be regarded as a profit or as an administrative fee. He described it, instead, as an “administrative fund” which could be used by the company to cover costs which were not directly reimbursable at Hanford or the Knolls laboratory.¹⁷³ Among items in this category, he listed certain administrative costs at Hanford, direct services rendered Hanford by General Electric administrative departments, services rendered the contract operation by other General Electric departments. Commission officials were vague, not to say in apparent contradiction among themselves, as to the meaning of the overhead provision. None of them would have thought to deny that the fund, whatever its purpose, offered a potential source of profits. Thus, for example, the Deputy General Manager of the Atomic Energy Commission, appearing before the subcommittee, conceded: “I think we all know, sir, that the sum in there is something which may be in the end, if they are desirous of maintaining more than they should, a profit.”¹⁷⁴ The Assistant General Counsel to the Commission pointed out that profits derived from this source could not be regarded as legitimate, since General Electric was under obligation to return to the government any portion of the fund remaining after the actual overhead outlay.¹⁷⁵

172. *Hearings before the Subcommittee of the Committee on Appropriations, United States Senate, on Independent Offices Appropriations Bill for 1950*, 81st Cong., 1st Sess. 1278 (1949).

173. Testimony of Mr. Harry A. Winne, G. E. vice-president: *Hearings before the Joint Committee on Atomic Energy on Investigation into the United States Atomic Energy Project*, 81st Cong., 1st Sess., pt. 8, 353 (1949).

174. *Hearings before the Subcommittee of the Committee on Appropriations, United States Senate on Independent Offices Appropriation Bill for 1950*, 81st Cong., 1st Sess., 1274 (1949). The confusion surrounding the overhead arrangement is further illustrated by Mr. Shugg's extraordinary reply to Senator Ferguson's question.

“Why do we talk about a dollar fee when we know under the terms of the contract they can keep more and you are paying them \$200,000 a month?”

“When I went into this,” said Shugg, “I tried to put the aspect on this [author's italics] that there was only a dollar fee in direct response to your inquiry when it was asked, and I believe it was read from the amendment that it so stated in the contract. My own opinion is that some of the sums which we are now talking about they may retain as outright profit. We do not know yet.”

175. Testimony of Joseph Volpe Jr., *Hearings before the Subcommittee of the Committee on Appropriations, United States Senate, on Independent Offices Appropriations Bill for 1950*, 81st Cong., 1st Sess. 1278-85 (1949).

It should be noted that under the contract the auditing is to be done by independent auditors, rather than by the General Accounting Office of the United States Government. The reason for this, it was stated, was that the Company was eager “not to get involved in Government accounting procedures,” which it described as “red tape.” See exchange on this point between Volpe and Senator Ferguson, *id.* at 1280-1.

It is worth repeating that the amounts involved are insignificant when related to the magnitude of the entire contract and the contractor's overall activities. But what troubles many observers is the belief that, in offering cost or cost-plus-fixed-fee contracts (with overhead allowance) the AEC has willingly continued certain wartime contract practices, or devised contract devices of its own, which are more costly to the Government than necessary and are deliberately weighted in favor of private business. The Commission for its part, has suggested that in the long run only a contract providing for profits, will afford adequate "incentive" to contractors. When that day arrives, the ambiguities in contract procedure will presumably be overcome.¹⁷⁶ Meanwhile, the new and untried technical fields into which the contractors must venture, the risks and hazards involved, the lack of adequate data for framing cost estimates, the demand for speedy performance, unexpected design changes when work is already underway, the fact that the contractor must draw heavily on the highly trained members of his staff who would otherwise be available for profitable private contracts, are among reasons advanced as justification for the type of contract now in use.¹⁷⁷

Critics of AEC contract policy, which is shaped to attract the supposedly aloof giants of industry, point to factors which should be (but in their opinion are not) taken into account in offering contracts to private companies. "We do not want a profit, but neither do we want to lose any money," a General Electric official told the Appropriations Committee.¹⁷⁸ Admirably put; but General Electric does not habitually enter into contracts with the hope of breaking even. The absence of immediate, large profits is balanced by the gain, cost-free, of invaluable technical and engineering knowledge, and great expectations, reasonably founded. In general, the argument against the Commission's contract policy runs somewhat as follows:

In deciding on contract policy, it seems strange to find the Government in the role of suppliant and the contractor as a skittish benefactor to whom concessions must be made. No undue weight should be attached to the handicaps and hazards attendant upon operations in this field of technology since

176. In answer to criticism of these contracts, Lillienthal said:

"We have no illusions that a cost-plus-fixed-fee contract is a particularly good contract form for the building of an industry, for improving its operations. It will do, in time of war, or for the construction of a particular facility. But we are trying by discussions and considerations, and some experience, to find a way of incorporating into these contracts, some incentive for improved operations."

Hearings before the Joint Committee on Atomic Energy on Labor Policy in Atomic Energy Plants, 80th Cong., 2d Sess. pt. 1, 21 (1948).

177. For an interesting discussion of Commission-Contractor relations see, UNITED STATES ATOMIC ENERGY COMMISSION, *THE OVERALL PROGRAM OF THE ATOMIC ENERGY COMMISSION*, excerpts from remarks and discussion in a press seminar in March 1949, p. 14 *et seq.* (1949).

178. *Hearings before the Subcommittee of the Committee on Appropriations, United States Senate, on Independent Offices Appropriation Bill for 1950*, 81st Cong., 1st Sess. 1279 (1949).

the underwriting of the full cost adequately protects the contractor against loss. No plausible reason can be advanced for offering the contractor special inducements, including such questionable devices as an overhead fund ambiguously defined. Finally, there is no possible justification for adopting a contract awards machinery not only admitted by the Commission to be inefficient but repeatedly proven to be conducive to various forms of malpractice.

Why, it has been asked, are the competitive bidding requirements for federal agencies systematically disregarded by the AEC? Why does the Commission assign so many of its management, construction and engineering contracts to a select coterie of contractors, even in the case of projects which do not require unique industrial and technical competence and which, it has been argued, could be carried out as well by a group of smaller firms as by a single large corporation? Even if the wartime plants at Oak Ridge and Hanford were "indivisible" units and therefore best managed by a single contractor, why is it that additional plants built since the war have not been assigned to new contractors? Why were construction, town management and research jobs awarded to operating contractors? If contracts are to be given only to "experienced" companies, *i.e.*, experienced in AEC operations, how is an outsider ever to become eligible? These are questions that members of Congressional appropriations committees have put to the Commission, bluntly and often; yet the answers have mostly been so vague and circuitous that it is hard to fathom their meaning—except perhaps that the AEC regards competitive bidding requirements as a nuisance (which, leaving aside their positive merit, is undoubtedly true) and finds it more agreeable and convenient to deal with the original small and tested circle of contractors. The Commission's enthusiasm for "decentralization" does not, apparently, extend to the point of bestowing its benefits on the business community as a whole.

The record is clear. Except for widespread activities in the search for source materials, a considerable increase in the use of radioisotopes by industry, science and medicine, and a fairly broad distribution of supply purchases, the atomic energy project is still conducted, as it was under the Manhattan District, by a small group of big companies under a few broad contracts. There are, it is true, thousands of small contractors and sub-contractors, but in dollar terms a dozen or so companies sit upon 80 per cent of the work. Analysis of Commission contracts in 1949 discloses that nearly the entire fissionable material and weapons production program was under the direction and management of three corporations: the General Electric Company, the Carbide and Carbon Chemicals Corporation, and the Sandia Corporation, a Western Electric subsidiary which handles weapons production. Since then du Pont has returned to the atomic energy complex to work on the hydrogen bomb. Contracts for construction of new Commission facilities show a somewhat broader distribution, but here, too, a few companies tend to monopolize the work. Of some \$300,000,000 in negotiated contracts let during the period January 1, 1947 to November 15, 1948, a single company

(Atkinson-Jones) got \$185,417,812 (60%); three companies approximately \$245 millions (80%), seven companies \$290 million (more than 95%). These figures are based on estimated costs and include only contracts for more than \$1,000,000. Architect-engineer contracts for the same period show that three of the fifteen companies listed controlled approximately half of the work, on an estimated dollar basis. As of March 31, 1949, the AEC had 250 prime contracts, totaling \$1,301,943,000. Eleven of the 250 companies received 80 per cent of this total. The figures for prime contracts let during the period June-November 1949 include several thousand obviously minor contracts, but exhibit the same pattern. Fifty contractors were awarded contracts valued at \$106,233,000 (about 80%) while 5,646 contractors shared \$24,873,000 (about 20%). During the period January-June 1950, 31 new prime contracts accounted for 91 per cent of the awards; from July through December 1950, 26 contracts totalling \$311,249,000 represented 94 per cent of the work which had been let. Construction contracts represent, of course, the major category, not only during the intervals mentioned, but throughout 1951 and, it is safe to predict, 1952.¹⁷⁹

Although Lilienthal, as chairman, gave no sign that he questioned the wisdom of concentrating management contracts in a small select group of industrial companies, his later writings suggest that he had misgivings on the score. These doubts related exclusively to the threat to free competition; they rose not at all from the unfortunate effects on Commission policies as a whole, and in particular on the proper discharge of its trust for the common benefit. In an article written in 1950, he characterized the "inner circle of private contractors," which now run the project for the government, as representing a system threatening competition "however well selected and diversified" these contractors might be.¹⁸⁰

From time to time, other Commission officials have expressed regret that a few companies dominate its most important operations. Among the reasons advanced for the persisting imbalance are that only a relatively few companies have the managerial competence to handle its huge business, that with so much at stake in the production program it is safer to rely on "old hands," that secrecy and security regulations make it difficult to bring new companies into the field. Still another reason is inheritance. Although it is difficult to escape the impression that AEC witnesses tend to ascribe to their predecessors the initiation of many practices for which they are criticized by Congress, while invariably claiming for themselves credit for whatever meets with praise, it must be conceded that the AEC did inherit from the War Department serious problems—as well as major advantages. The Manhattan District, organizing a gigantic project under war conditions requiring both top speed and top secrecy, invited the participation of leading American industrial corporations and negotiated contracts with them. Some of these contracts had not

179. See *e.g.*, Appendix Tables I-III.

180. Lilienthal, *Free the Atom*, *Collier's*, June 17, 1950.

expired in 1946 and were therefore assumed by the Commission. In other instances, the Commission simply ratified contracts which had been negotiated by the Manhattan District and were awaiting final approval. Thus, when the du Pont Company asked to withdraw from the atomic energy project at the war's end, the Manhattan District selected the General Electric Company as a qualified successor. A contract was negotiated with General Electric, examined by the Commission when it took over in January of 1947 and eventually ratified. In this instance, as in others, there was no question of soliciting competitive bids.

Since the Commission prefers to "select" its major contractors, and "negotiate" their contracts, it disregards competitive bidding methods so far as the more important jobs are concerned. We have already seen one example of Congressional reaction to this policy, namely Mr. Thomas's strictures on the excessive costs of non-competitive construction contracts. Congressional committees have also expressed concern lest the elimination of competitive bidding facilitate concentration and foster the growth of monopoly.

The Atomic Energy Act authorizes the Commission to dispense with the competitive bidding requirements fully set forth in other statutes.¹⁸¹ This provision was based on the recognition that the Commission in the interests of simple, efficient operation and, perhaps, of security, should have the discretionary power to omit a step obligatory in normal government business. Clearly, management contracts must be made on the basis of many factors—security, safety, experience, to mention a few of first importance—and the level of the bid, wherever the practice of bidding is at all applicable, should be considered only one element in awarding the contract.

It is similarly true that management contracts should be used by the Commission to promote both the immediate and long-range objectives of the Atomic Energy Act. The Commission has the sole responsibility for producing fissionable material and promoting advances in the technology of production. It has primary responsibility for research and development in fundamental and applied science. It has a broad and comprehensive responsibility for encouraging and developing the useful applications of atomic energy. Consequently, its contractual relations with industry should be understood as more than mere commercial arrangements, wherein the public interest is

181. "Any contract made under the provisions of this paragraph, may be made without regard to the provisions of Section 3709 of the Revised Statutes (41 U.S.C. § 5 (Supp. 1949)) upon certification by the Commission that such action is necessary in the interest of the common defense and security, or upon a showing that advertising is not reasonably practicable . . ." Section 4(c) (2) (b).

The following brief bibliography of material on the vexed problems of competitive bidding may be useful: MILLER, PRICING OF MILITARY PROCUREMENTS 27-37 *inter alia* (1949); (Mr. Miller's valuable book is also the source of the items which follow) LUNENBERG & BARBOUR, GOVERNMENT PURCHASING: AN ECONOMIC COMMENTARY, (TNEC MONOGRAPH 19, 1940); Freiberg, *How Government Buys: An Appraisal*, 2 PUBLIC POLICY 262-88 (1941); Miller, *Military Procurement in Peacetime*, 25 HARV. BUS. REV. 444-62 (1947).

best served by the lowest bid. Management contracts must be regarded as instruments of social and economic policy, as part of a meaningful and coherent design embracing the Commission's major activities.

Unfortunately, it is not at all clear that the Commission has used its authority to grant non-competitive contracts with these broader considerations primarily in mind. One cannot fail to be disturbed by the number of contracts into which the Commission has entered without first inviting bids, and by the unconvincing justification offered for the practice. Members of the Joint Committee in 1949 closely questioned the Manager of the Commission's New York Operations Office on the contract policy of his office.¹⁸² From his testimony it was determined that of the 250 contracts which his office was then handling only 30 had been let through competitive bidding. Of the 220 remaining contracts, 28 were with public utilities, other government agencies or non-profit institutions, leaving 192 contracts that had been "negotiated."¹⁸³

The Manager told the Committee that 151 of these involved classified work. On being asked to explain why the 41 remaining contracts were not advertised, he replied: "Often it is necessary to place unclassified work that relates to classified work and we are forced to go to the firm handling the related part. For instance on some of the work that I do for Los Alamos and Sandia we can separate from a piece of equipment a small piece that we could handle on an unclassified basis, but if that has to fit into the classified device . . . it cannot be advertised."¹⁸⁴ If this involuted explanation satisfied the Committee, its members were accommodating to a degree rarely found in public servants.

The New York manager explained further that in handling classified contracts the Commission's uniform practice was to investigate a few companies believed capable of doing the work in question and to negotiate a contract with the one that seemed best qualified. He added that the Commission sought the advice of scientific, engineering and other outside agencies before making its final decision. He insisted that these negotiated contracts contained an element of competition, since the Commission frequently talked with several companies before deciding which one to use.¹⁸⁵ There was no showing that, when several companies are approached, the AEC makes an effort to elicit bids from even this select group and to award the contract to the lowest bidder.

182. The New York Operations Office represents the AEC as regards the Brookhaven National Laboratory Contract, functions as a procurement office for other divisions of the Commission, handles the processing of feed materials for Oak Ridge and Hanford and does some special procurement for the laboratories at Los Alamos and Sandia. Its manager is contracting officer for about \$100 million annually. *Hearings before the Joint Committee on Atomic Energy on Los Alamos Retrocession Bill and AEC Contract Policy*, 81st Cong., 1st Sess. 81 (1949).

183. *Id.*, at 81-2.

184. *Id.*, at 82.

185. *Id.*, at 81.

When security is assigned as the main reason for not seeking open bids, it is hard to see why closed or secret bids from companies whose trustworthiness has been established would not in a measure meet the problem. Congressman Thomas put the matter rather sharply in hearings before his committee. "I understand," he told AEC officials, "secrecy is a very valuable part of this work, but I do not understand, to follow your thinking, when you pick contractor X as against contractor Y, how you determine . . . that contractor X and his several thousand employees are going to keep their mouths closed a little tighter than contractor Y. You have to assume that when you send out the invitation to contractor X and do not send it to contractor Y, all of which leads me to think that there is quite a bit of favoritism in your construction operation here." The reply made by Messrs. Wilson, Lilienthal and Shugg was vague, if not indeed altogether unresponsive and Mr. Thomas contented himself with the observation that it would be better for AEC to "get out and do a little advertising and give everybody, more or less, a fair run at this public work. . . ."¹⁸⁶

It is still more questionable to dispense with statutory competitive bidding requirements when the security factor does not arise. Here the most striking examples are in the area of community management. At Oak Ridge, the community is run for AEC by the Roane-Anderson Co., a subsidiary of the Turner Construction Co. of New York which, in turn, participated both in the construction of the town itself (together with Stone & Webster) and in the building of the gaseous diffusion plants. Roane-Anderson, as well as Turner, was selected for the work; in fact Roane-Anderson had been set up by Turner in 1943 at General Groves' request "to undertake that headache of operating the town." The AEC "inherited" the arrangement and continued it. No attempt was made by the AEC to let the contract by advertising and competitive bidding even though Congress had complained of various shortcomings of performance, as well as excessive managerial fees and the Commission had conceded the validity of some of the charges. "You have a very tight and close corporation," Mr. Thomas observed, "and the boys who bought in on the initial ground floor are still the ones that are getting all the business." "The answer," replied Carroll Wilson, "is no. We have brought in a good many new contractors since the wartime period, and we are seeking to bring in more and more. Our purpose is to get more competent organization with experience." But the proof submitted in support of this statement was not overwhelming.¹⁸⁷

During the 1949 Joint Committee hearings, one Senator wanted to know why the Commission used a "selective process" in inviting businessmen to

186. *Hearings before the Subcommittee of the Committee on Appropriations, House of Representatives, on the Supplemental Offices Appropriation Bill for 1949*, 80th Cong., 2d Sess. 808-9 (1948).

187. *Id.*, at 810.

establish their stores and shops in Commission communities.¹⁸⁸ Other criticism noted how few were the companies that appeared to have done most of the community construction at Los Alamos.¹⁸⁹ As Senator McMahon pointed out, "they have had it pretty creamy."

The Commission has not been deaf to these criticisms and has offered Congress assurances that, as far as possible, contracts will be let on a competitive basis. Both procurement and construction contracts, it has been stated "to the extent that it is practicable and is consistent with security requirements . . . are [now] let by competitive bidding on a lump-sum or unit price basis."¹⁹⁰ Moreover, the AEC issued in November of 1949, "A Guide for Contracting of Construction and Related Engineering Services."¹⁹¹ This laid down the formal policy under which the Commission announced that it sought "to the fullest extent feasible" to use lump sum contracts awarded on the basis of competitive bidding. "Where formal advertising cannot be used," the Commission said, it would seek "as full and free competition as is feasible."¹⁹² No similar regulations have been issued for management contracts.

188. *Hearings before the Joint Committee on Atomic Energy on Investigation into the United States Atomic Energy Commission*, 81st Cong., 1st Sess. pt. 13, 556-71 (1949).

Senator Millikan was indignant over the fact that desiring to establish a newspaper at Richland, Mr. Schlemmer, local AEC manager, had issued "invitations" to bid to some 23 persons or organizations.

"What gives you this God-given right to issue invitations to people who shall enjoy the benefits or the hazards of that town? What is in the back of your heads that leads you to a philosophy of that kind? . . . What is your explanation for that? The security suggestion, I respectfully say, is sheer bunk, because the town is open to anyone who wants to go through it. . . ."

189. *Id.*, pt. 14, at 610-11.

190. Carroll L. Wilson, statement submitted to Joint Committee on Atomic Energy; *Hearings before the Joint Committee on Atomic Energy on Los Alamos Retrocession Bill and AEC Contract Policy*, 81st Cong., 1st Sess. 49 (1949).

191. U.S. ATOMIC ENERGY COMMISSION, *A GUIDE FOR CONTRACTING OF CONSTRUCTION AND RELATED ENGINEERING SERVICES* (1949).

192. *Ibid.*

III. BASIC POLICIES IN CONTRACTING FOR ENGINEERING AND CONSTRUCTION SERVICES *General Policies*

1. To the fullest extent feasible, construction contracts are made on a lump-sum or unit price basis using the formal advertising procedures described later.

2. Where formal advertising cannot be used, as full and free competition as is feasible is obtained to secure the required services.

3. Special effort will be made to place contracts with small-business concerns competent to perform satisfactorily.

Engineering Services

Contracts for engineering services are negotiated on a lump-sum basis or if that is not feasible because work cannot be clearly defined on cost-plus-a-fixed-fee basis.

Construction Services

Normally, where specifications are complete and defined, construction contracts are let by formal advertising, or if circumstances do not permit this, by invited bids, or by negotiations. Construction contracts let by formal advertising or by invited bids are let on only a lump sum or unit price basis. Construction contracts let on a negotiated basis may be a lump sum, unit price or cost-plus-a-fixed-fee type of contract.

However, there is no reason to believe that the Commission has in fact revised its contracting methods or abandoned its predilection for dealing with the big firms it knows best and has worked with from the start. Management contracts in the field of production comprise the bulk of AEC business and they are as concentrated as ever; in these areas of work the question of competitive bidding never arises. Construction, engineering and architectural contracts continue in the majority of instances to be "negotiated," let to a selected firm or group of firms. Even the procurement of supplies is often conducted without the solicitation of bids. The available statistical compilations tell only a small part of the story, to be sure, but the information they contain clearly reveals the bent of AEC contract policies. In a single typical period, July through December, 1950, 93.5 per cent of all AEC contracts (in dollars) were negotiated; 6.5 per cent were awarded on a competitive basis. In the category of subcontracts 51.4 per cent were negotiated, 48.6 per cent let competitively. Allowing for the fact that a few large management and construction contracts account for the overwhelming percentage in dollar value, of awards by negotiation, the figures show that even in terms of the number of contracts, regardless of size, awarded by each method, the class of negotiated contracts represents a substantial portion of the total. (Additional data may be found in Appendix Table III.)

The repeated use of the qualifying criterion of "feasibility" in the declaration of construction contract policy seems, whatever the assurances to the contrary, to preclude bidding except for construction not even remotely connected with classified work. There is every sign that the Commission considers the negotiated contract less onerous to administer, and less hazardous, than the competitive award. The need for secrecy and security may be advanced in our period to justify practices unacceptable under normal circumstances, but these very precautions can also be used to cloak practices that have been carried to unhealthy extremes. This does not mean that the record of the Atomic Energy Commission as to the type of contracts offered, the elimination of competitive bidding, the special advantages conferred on a handful of companies, and so on, is open to any blanket condemnation. Its course has often been dictated by political, economic and technological factors beyond its control. But the facts still are that the Commission has cried necessity on not a few occasions when none was shown to exist, and that the objective dilemmas of the atomic energy program engender many unfortunate practices, no less unfortunate for being unavoidable.¹⁹³

193. A defense of contract policies was offered in an address by Gordon Dean in 1950, at the time Commissioner, and later chairman, of the Atomic Energy Commission:

"Our entire physical plant has been built by American industry, albeit with Uncle Sam's dollars, and with minor exceptions all of our installations are operated by non-governmental agencies. Eleven-twelfths of the personnel in the program, while paid by Uncle Sam are nevertheless employees of contractors.

"Industry therefore is in a very real sense not only participating in the atomic energy program today but running it. . . .

It is not at all certain, one must grant, that at the present time a profit contract (with or without competitive bids) would invariably benefit the government more than the prevailing fee arrangements. The complex field of atomic energy still involves a number of unprecedented problems, and contractors would properly endeavour to protect themselves against unforeseen expenses by submitting very liberal estimates. However, there are even now certain types of construction and operating jobs on which a good deal of past experience is available and for which the risks are no greater than for assignments of similar size in any comparable industrial field. As time goes on, more and more AEC work will fall into this charted category where the principle of a lump sum contract should best serve the public interest. But whether it does finally prevail would seem to depend less on what stand the Commission takes; more on whether industry eventually decides that it stands to gain more from a lump sum than from a fixed-fee contract.

III. CRITICISM OF DECENTRALIZATION

Coupled with charges of extravagance and waste in the atomic energy project has been the complementary criticism already noted in connection with the Hanford overrun, that the Commission has carried decentralization so far that headquarters is unable to exercise proper supervision over its contractor-managed operations and other activities in the field. The principle of decentralization has long appealed to Lilienthal who regards it as the defense against the danger of a Federal authority expanding at the expense of initiative and responsibility on the local level. In *TVA: Democracy on the March*, for example, he devoted several chapters to the merits of decentralization—"through which many of the powers of the central government" might "be administered not by remote control from Washington but in the field."¹⁹⁴ When the Atomic Energy Commission was organized, Lilienthal was the only Commissioner with extensive experience as an administrator; from the outset, the Commission subscribed to the decentralization theory and conferred broad powers on its contractors as well as its field managers. Lilienthal's devotion to decentralization stems from sound democratic principles but he advanced it at times with an enthusiastic disregard of the dangers it might

"There is, for example, virtually no private risk capital being employed in the field of atomic energy today. This is not normal industrial participation.

"I mention inequity. This results from the fact that certain industrial concerns which are in the program as prime contractors have an advantage over those concerns which do not happen to be contractors. This means that certain large companies (and believe me we welcome them) are today securing certain technical know-how while other industrial concerns are somewhat in the dark having access only to scientific facts and industrial know-how that is not classified. . . ."

(Gordon Dean, remarks at the Phi Beta Kappa initiation, Duke University, Durham, North Carolina, March 15, 1950. U.S. Atomic Energy Commission, March 14, 1950.)

194. LILIENTHAL, *TVA—DEMOCRACY ON THE MARCH* 145-6 (1944).

substitute for those it overcame. The need for greater restrictions on field manager autonomy soon became apparent and reorganizational changes followed;¹⁹⁵ the Commission continued, however, to defend and to hold inviolate the autonomy of its contractor-operators.

From his theory of dispersed authority, Lilienthal derived his conviction that the widest possible latitude should be given the contractors in the field. They were, in his words, to be regarded as "partners" with the AEC rather than as agents or hirelings. He contended before the Joint Committee in 1949 that the Atomic Energy Commission should not become a "policing agency" but should seek to "develop [in its contractor] a sense of that same responsibility for a government dollar which we ourselves should feel."¹⁹⁶ Senator Hickenlooper took issue as to the AEC's duties, saying: "I submit . . . that while I believe that the contractor system of operation has its merits; and I am not opposed to it, nevertheless, I think it is the very function of the Atomic Energy Commission to be a policing agency over seven hundred-and-some million dollars of public funds, and over \$400,000,000, let us say of contract authority."¹⁹⁷

Lilienthal, apparently was unconvinced. In *This I Do Believe*, he reaffirmed his position:

"The major purpose of the Commission's policies should not be the negative one of 'checking' and 'policing' but the creation of positive incentives that will stimulate private concerns to carry increasingly larger responsibility. Only in this way, in the long run, can great technical progress be made, dollar costs cut and the unfortunate consequences of this necessary departure from our traditional industrial course be minimized."¹⁹⁸

Neither Lilienthal nor Hickenlooper were touching the real issues involved: the former was beating a dead horse and the latter attempting to revive it. The problem of AEC decentralization has many facets. These include the determination of a sensible dividing line between policy-making and executive functions; the apportionment of administrative authority between the Commission and the General Manager and between home and regional offices; the autonomy of contractors vis à vis the principal and local seats of authority; the status of sub-contractors in relation to their primes as well as to the Commission; the relative merits of functional and geographical decentralization; the extent to which headquarters is able to keep itself informed of current problems in the field, to check on managerial efficiency and the like. In surveying AEC operations Congressional committees have, as it is to be expected,

195. See pp. 1277-9, SECTION ONE.

196. *Hearings before the Joint Committee on Atomic Energy on Investigation into the United States Atomic Energy Project*, 81st Cong., 1st Sess. pt. 2, 502 (1949).

197. *Id.* at 503.

198. LILIENTHAL, *THIS I DO BELIEVE* 131-2 (1949).

avoided the more difficult and subtle problems and concerned themselves only with the more obvious aspects of decentralization, those dealing with apparent examples of waste, duplication or ignorance on the part of the Commission as to what was happening at its plants and in the supporting communities.

In the Joint Committee Investigation an abundance of testimony was introduced purporting to show that the inefficiency and mismanagement charged by Hickenlooper were in many instances the direct result of AEC decentralization doctrines and practices. Not a few of the examples offered were insignificant in substance and could in any case no more be ascribed to decentralization than to the Photian Schism. The Commission with its hundreds of separate installations and offices must obviously delegate authority. The Hanford overrun, to be sure, was an inexcusable dereliction and there were other less costly examples. The majority report of the Joint Committee took the Commission to task only for Hanford and otherwise gave its blessing to the existing system of administration and control; the minority report, conceding that delegations of authority were necessary, asserted nevertheless that "in many instances it [the Commission] has failed to maintain adequate supervision of these delegations [with] . . . the result . . . that in certain important projects the Commission has been insufficiently informed of what is going on. This has importantly and adversely affected the security of the program and has produced inefficiencies and considerable waste of public money."¹⁹⁹

As usual, the House Appropriations Committee has been pungent in its criticism. Congressman Wigglesworth of Massachusetts, Chairman of the House Subcommittee on Independent Offices, was thunderstruck on learning that the manager of the Oak Ridge operations was "empowered to make purchases or enter into contracts in amounts ranging up to \$5,000,000 without prior approval by the general manager." Carroll Wilson's information, intended as reassurance, that the manager at Hanford had the same authority, the manager at Santa Fe authority up to \$3,000,000; the New York and Chicago managers up to \$2,000,000, failed of its purpose.

"I am here to be enlightened, [said Wigglesworth] but to me it is perfectly amazing to have any such delegation of authority, and it indicates, to say the least, a very loose control over the financial operations of this activity. I cannot conceive of any industry turning over authority, or delegating authority to any comparable extent."²⁰⁰

Duplication of effort resulting from decentralization also caught the attention of the House Appropriations Subcommittee. Its investigators in January 1950 reported that "at every site visited, the AEC maintained a large staff, which would indicate that either the responsibility has not been delegated as

199. SEN. REP. NO. 1169, 81st Cong., 1st Sess. pt. 2, 2 (minority views) (1949).

200. *Hearings before the Subcommittee of the Committee on Appropriations, House of Representatives, on the Supplemental Independent Offices Appropriation Bill for 1949*, 80th Cong., 2d Sess. 869 (1948).

claimed, or that considerable duplication exists in certain functions which are performed both by AEC and the contractors."²⁰¹

The grant of broad independence to field offices and contractors is not only consistent with the aim of keeping down the size and power of the central bureaucratic establishment but may be regarded as a corollary of the doctrine of delegating managerial functions to private industry.²⁰²

Congress has attacked both delegation and decentralization. Some of this criticism has been valid and pointed, but most of it represents no more than a vague, though perhaps justifiable, uneasiness over the magnitude of AEC expenditures and the fact that it is so difficult to pin down the responsibility for major decisions. Congressmen who complain about the concentration of bureaucratic power are as likely to complain about the delegation of such powers, with the result that the heads of federal departments are thoroughly confused as to what is expected of them. Making allowance for the real dilemma, it yet remains that the Commission has delegated and decentralized authority to an unprecedented degree and that Congress has taken alarm at the loose pattern of control and the blurring of responsibility entailed in these practices. It is pertinent to add that the Commission, in this controversial area, as elsewhere in its relations with Congress, roused the suspicions, not to say the hostilities, of a number of the legislators by exhibiting evasiveness and lack of candor in its testimony. Committee members have repeatedly charged that the Commission acts as if it were "a law unto itself";²⁰³ that no one can control its expenditures and "the sky is the limit";²⁰⁴ that AEC contentions that contractors make no profit are misleading;²⁰⁵ that the Commission conceals the truth from Congress and hides behind security, "which

201. This quotation and the one which follows from the investigator's report is to be found in Congressman Thomas' remarks:

"'Examination of AEC contract organization charts indicates that personnel at all levels are graded quite high, yet it appears that most of them are unable to make any decisions even in the most minor matters without numerous conferences at the site and with personnel from other locations. Despite the theoretical decentralization of the Commission, most of the decisions reached, after a series of local conferences, must then be referred to headquarters in Washington. Further conferences are then held in Washington before the matter is finally resolved.' "

Hearings before a Subcommittee of the Committee on Appropriations, House of Representatives, on Urgent Deficiency Appropriation Bill, 1950, 81st Cong., 2d Sess. 51 (1950).

202. See LILENTHAL, THIS I DO BELIEVE 130 (1949).

203. See statement of Congressman Francis Case of South Dakota, *Hearings before a Subcommittee of the Committee on Appropriations, House of Representatives, on Urgent Deficiency Appropriation Bill, 1950, 81st Cong., 2d Sess. 66 (1950).*

204. *Hearings before the Subcommittee of the Committee on Appropriations, House of Representatives, on the Supplemental Independent Offices Appropriation Bill for 1949*, Congressman Wigglesworth of Massachusetts, pp. 55, 63.

205. *Ibid.* See for example comments of Congressman Thomas of Texas and Case of South Dakota, pp. 55 and 63 respectively.

is perhaps your best asset";²⁰⁶ that AEC witnesses talk "in terms of glittering generalities without adequately touching the more prosaic and practical things";²⁰⁷ that the Commission's "refusal to furnish the Committee with information and appraisals of its various budgeted items . . . leaves much to be desired in establishing the confidence which the committee must have if it is to continue to supply these large grants. . . ."²⁰⁸ Numerous other examples could be cited; but these suffice to show that in its dealings with Congress, no less than in its general relations with the public, the Commission has added to its own burdens by withholding essential information about matters wholly unrelated to national security. It is of course possible that on balance, and despite the added burden of facing Congressional antagonism, the Commission has found its information policy expedient and more convenient than a policy of more liberal disclosure.

SUMMARY

The following brief observations seem a fair summary of the Commission's production program:

From the standpoint of material results, there is reason to believe that the program has gone well. It cannot be said, to be sure, that the AEC has everywhere made a brilliant technical record. Although vast sums have been lavished by the United States on production processes and plant, there is evidence that in certain important phases of manufacture—plutonium separation, for example—other countries such as Canada have at only a small fraction of our outlay surpassed our methods.²⁰⁹ It remains that the Commission's

206. "Your estimates are no more than your very best guess upon what the prime contractor estimated. I believe the evidence shows so far that when it gets up here that you generally agree to the estimate of the prime contractor. Someone in the Atomic group used the words that the estimates were high, wide and handsome. I do not see why the committee has to take a pair of pliers and pull the information from your teeth as to what your contractors fees are. Again you want to hide behind your security which is, perhaps, your best asset."

Congressman Thomas of Texas: *Hearings before the Subcommittee of the Committee on Appropriations, House of Representatives, on Second Supplemental Appropriation Bill for 1951*, 81st Cong., 2d Sess. 220 (1950).

207. Senator Clyde Reed of Kansas: *Hearings before the Subcommittee of the Committee on Appropriations, United States Senate, on Supplemental Independent Offices Appropriation Bill for 1949*, 80th Cong., 2d Sess. 90 (1948).

208. "As a matter of fact there is some feeling among the membership of the committee that the Commission has taken advantage of its strategic position in modern military defense to avoid facing the practical realities. . . . The impression left with the committee is one of general extravagance."

H.R. REP. NO. 2245, 80th Cong., 2d Sess. 2-3 (1948).

209. During October, 1951, the House and Senate unanimously approved an amendment to the Atomic Energy Act which bears directly on the point discussed in the text. This amendment modifies § 5(a)3 relating to possession, transfer, export and import of

installations, so far as is known, are in good working order; the facilities of the supporting communities have been improved and are gradually being put on a permanent basis; various expansion and breeder programs are underway; the hydrogen bomb project is moving forward; the stockpiles of fissionables and bombs are large and their growth is accelerating. For all its grumbling, Congress is obviously satisfied with the progress made: there are a few mischievous critics in both parties; but the consensus in both legislative and executive branches is that the Commission has satisfactorily discharged its production responsibilities. The Defense Department, directly and through the Military Liaison Committee has repeatedly voiced its approval. Most important, the scientific and technical advisers of the General Advisory Board, who are alone competent to judge the program in its engineering and industrial aspects, have registered their approval.

It is in its contract policies, in its general conception of the relation of the atomic energy project to the public and to private industry, that the Commission in the opinion of many disinterested observers has fallen short of its opportunities, if not of its mandate.

The Commission has seemed obsessively determined to dispel the notion that the Atomic Energy Act is socialistic. It has delegated every major operating function of the production program, and most of the minor ones, to private contractors. It has concentrated its assignments among a handful of large industrial corporations. In many instances, it has used a type of contract known to be excessively costly, inefficient or otherwise disadvantageous to government and has defended its choice with the argument that special concessions are necessary to induce the participation of private industry. The long range social and economic implications of this policy must also be considered. Though less measurable, they are far more important than the immediate increase in annual costs. Management contracts are instruments

fissionable material, or its production outside of the United States, and adds a new section, § 10(a)3, to § 10 dealing with control of information. The modifications would permit the Commission in the interests of the "common defense and security," and subject to a formidable array of limitations and safeguards, "to enter into specific arrangements involving the communication to another nation of restricted data on refining, purification, and subsequent treatment of source materials; reactor development; production of fissionable materials; and research and development relating to the foregoing. . . ." They would also permit "private American contracting firms" to engage directly or indirectly in the production of fissionables outside of the United States (until now *only the Commission* was so authorized), by authority of the AEC, where the latter deemed such activities necessary to "assist in implementing" an arrangement entered into under § 10(a)3. The Joint Committee Report, SEN. REP. NO. 894 to accompany S. 2233, H. R. REP. NO. 1104 to accompany H. R. 5646; 82d Cong., 1st Sess., states that unless the proposed amendment is adopted, permitting the Commission in effect to barter for information and to take advantage of scientific and technical knowledge in areas where other nations have forged well ahead of us, "the United States will be less well-equipped—in measurable degree—to use atomic energy for defense purposes."

The moral of this sensible amendment and the extent to which it reflects on past policies speak for themselves.

of social and economic policy. In dealing with only a small segment of industry, the Commission has failed to use these instruments to encourage free enterprise as a whole.

The Commission's relations with Congress and the Joint Committee have often been difficult, particularly in matters of security; but the major role assigned to private industry in the atomic energy project, in an advisory as well as managerial capacity, has undoubtedly restrained Congressional criticism. Business and industry, notably, big business and big industry, are almost invulnerable to attacks based on the security bogey, either by Congress, the FBI, the Defense Establishment, the press, or professional-patriotic groups. Most Congressmen are obviously well-satisfied with the Commission's contract policy. Congressional criticism of Commission contracts has been essentially minor and sporadic, confined to the most flagrant abuses.

In conducting itself more or less as trustee for American industry, the Commission has clearly stretched the Atomic Energy Act to its limits: some observers have commented that the limits have been breached. When it is opportune to go further there will be strong pressure to amend the Act. As of the present, the Commission has done nothing to hinder the transfer to private industry for which such an amendment would be designed; indeed it has paved the way for the change.

Before turning to examine AEC's labor relations policies, it should be noted that I have perforce omitted from this discussion a number of other important problems. One of the main topics which should not be overlooked is security and safety measures.²¹⁰ Adequate protection of atomic energy installations against sabotage, espionage, or losses of materials or classified information due to negligence, is, almost needless to say, essential. The Commission has, however, in this field gone far beyond the requirements of prudent self-interest. It has preoccupied itself with security measures ranging from fences, guards, and electronic watchmen to the most involved materials accountancy procedures.²¹¹ Some of these safeguards are both necessary

210. See note 123 *supra*.

211. One of the most exacting tasks of the AEC is providing for the security of the fissionables under its control and to this end an elaborate system of materials accountancy has been established. The magnitude of the task is indicated by the Commission's statement that, as of June 1949, "the time consumed on the material accounts and the information that goes into them was equivalent to the full time of 610 workers." *SIXTH SEMI-ANNUAL REPORT* 130 (1949). The cost was about two and a half million dollars a year. Since then the scope and the cost of this activity have increased considerably. *Id.* at 136.

Like Silas Marner, the AEC is forever counting its treasure, except that fissionables are many times more valuable than gold, and every infinitesimal part of a grain must be accounted for. At literally thousands of points through its complicated operations, AEC technicians must take samples and determine the amount of material that is present. *Id.* at 131.

In addition to the difficulty of dealing with various mixtures, there are samples in which the U-235 or plutonium is present in such small quantities that it may represent only a few parts in a million and "extremely delicate chemistry" is required to detect it.

and expensive; others are merely expensive—but otherwise harmless forms of paranoia. On the other hand the failure to evolve a rational program in the sphere of information controls, for example, has not only seriously impeded the Commission's own activities but has had an incalculably adverse effect on nuclear research and the training of scientists throughout the United States. One may concede, in mitigation, that it is not easy to see how, in this field,

This problem may be further complicated by the fact that chemical analysis may not suffice. *Ibid.* It should be remembered also that the materials to be measured give off dangerous radiations and present other disagreeable obstacles to the technician handling them. Plutonium, for example, is so "violently radioactive that it must be analyzed by remote-control apparatus and observed through systems of mirrors." *Id.* at 131-2.

Again, there are many uncertainties in establishing inventories of materials. The Commission describes a typical situation as follows:

"Working on the development of a new type of nuclear reactor, the laboratory needs to know how certain objects made of enriched uranium will behave under neutron bombardment. The laboratory takes a certain quantity of the material out of its vault—a quantity measured accurately to hundredths of thousandths of an ounce—and ships it, under armed guard, to a contractor. The contractor makes the 12 objects that are required and ships them back to the laboratory—together with the debris resulting from the manufacturing process; the machine turnings, a tiny amount of powder, the floor sweepings, the wiping rags, and the wash solution used in the process. All of this debris is processed (at a second laboratory where facilities are available), and after much exacting work the waste material is analyzed and the uranium in it measured.

"But the 12 fabricated objects cannot be analyzed for their uranium content; to do so would be to destroy them and defeat the purpose of making them. They are scheduled to be irradiated in a reactor and subjected to certain tests. After irradiation they will be violent radioactive; they will have to 'cool' for months before chemists can dissolve and analyze them for inventory purposes. The laboratory, meanwhile, cannot verify the balance on its books on the operation. And both the chemical and physical composition of the material will probably be changed after irradiation, so that the exact amounts of fissionable material they originally contained can only be computed, not measured directly." *Id.* at 132.

In June 1947 the AEC set up a Source and Fissionable Materials Accountability Branch in the Division of Production. Its functions are to assure "(a) Procedures for recording and reporting inventories and transfers within and between plants and laboratories. (b) Sampling and analysis methods to determine accurately the quantities and qualities of source or fissionable materials involved at each stage. (c) Statistical methods to evaluate the accuracy and precision of measurements, that, is the reliability of the data." *Id.* at 133-4.

By late 1947 the Commission's regional managers were assigned certain responsibilities in materials accountability and the main lines of the accountability system were established. *Id.* at 134. Under the Atomic Energy Act, the Federal Bureau of Investigation is charged with the responsibility of investigating all violations of the Act. Section 10(b) (5) (c). AEC regulations require notification of the FBI whenever "there is reason to suspect that source or fissionable material may have been stolen, or whenever there are discrepancies in the fissionable materials accounts that are greater than normal and may indicate nonprocess loss." SIXTH SEMI-ANNUAL REPORT 136 (1949).

Despite the extraordinarily complicated and novel character of the problems of material accounting, the AEC has achieved an excellent record. Its inventory procedures are efficient; the fissionable materials in its custody and that of its contractors have been

the Commission could have withstood the forces of hysteria and ignorance. Certainly, it has not done so and its record, however human, is not one to inspire confidence in the agency's independence; much less does it show any attempt to stem the tide of unreason.

Other significant matters to which I have found space to devote only passing notice or have had to relegate, for synoptic treatment, to the footnotes are subcontracting,²¹² accounting methods,²¹³ ownership of fissionable materials,²¹⁴ the manufacture of production facilities;²¹⁵ and problems relating to feed material operations. Although beyond the scope of this article, these topics, together with the labor policies discussed below, must be carefully attended for a balanced understanding of AEC production policies.

SECTION FOUR: LABOR RELATIONS AND POLICY

I. BACKGROUND OF LABOR RELATIONS

More than 100,000 persons were in 1951 engaged on the atomic energy program. Of these, about 6,000 were employees of the federal government; and the rest worked for AEC contractors.²¹⁶ Commission employees enjoy the advantages, and are subject to the restrictions and disabilities, characteristic of federal employment generally. Among the principal advantages are

scrupulously guarded and conserved. Nevertheless, the Commission in 1949 came in for sharp criticism of its entire security and materials accountability system as a result of the apparent loss of a small quantity of enriched uranium oxide. It also was reproved for failure promptly to notify the FBI of the loss. See *Hearings before the Joint Committee on Atomic Energy on Investigation into the United States Atomic Energy Project*, 81st Cong., 1st Sess. pt. 9, 360 *et seq.* (1949); *Hearings before the Joint Committee on Atomic Energy on Uranium Inventory at Oak Ridge*, 81st Cong., 1st Sess. (1949). No evidence was adduced of culpable negligence, much less of sinister actions—despite the efforts of Senator Hickenlooper and like-minded colleagues, by indulging in fantasies about what might have happened, to discredit Lilienthal and the AEC. The scientific and human problems confronting the AEC in its work in this sphere were fully brought out in the Joint Committee Hearings. Together they make a fascinating story, yet one with a familiar ironic twist. For the fact is that neither the members of Congress, the press, nor the general public had even a remote grasp of the AEC's job in guarding materials, of the quantities involved, of the difficulty of keeping records accurate to the milligram, of the normal incidence of loss in any manufacturing process, of the unique aspects of materials control in the atomic energy industry, of the AEC's painstaking—and successful—efforts to solve this many-sided responsibility; and the victim of this wide-spread ignorance was the AEC, the agency which was in the best position to enlighten opinion, but had failed utterly to do so.

212. See note 140 *supra*.

213. See note 146 *supra*.

214. See note 94 *supra*.

215. See note 114 *supra*.

216. See speech of T. K. Glennan, U.S. Atomic Energy Commissioner in U.S. Atomic Energy Commission Release, Oct. 23, 1951.

tenure of employment,²¹⁷ substantial annual and sick leave, retirement benefits and various welfare plans. The principal restriction is denial of the right to strike. Contractor employees, on the other hand, as the result of the Commission's labor and contract policies, find themselves in the anomalous position of being denied certain advantages of federal employment (extended annual and sick leave, for example), and yet being severely limited in exercising their full rights of collective bargaining and for all practical purposes deprived of the right to strike. This double disadvantage creates a confused, uneasy situation and has resulted in labor difficulties in the past. Union members and their leaders are resentful and apprehensive; the Atomic Energy Commission is aware that its makeshift labor policies are a source of minor vexations and threaten more serious disturbances that could break the continuity of operations. For a better understanding of the present situation it is necessary briefly to review the history of labor relations in the atomic energy industry.

When the Army established its major atomic energy plants at Hanford, Oak Ridge and Los Alamos, thousands of skilled workers were required on short notice. It was wartime and the consequent scarcity of labor, combined with the remoteness and isolation of these centers and the necessity for keeping secret their very existence, enormously complicated the task of recruitment. Union cooperation was therefore indispensable. It was "sought and freely given."²¹⁸ But for security reasons the Manhattan District deemed it essential to prohibit normal labor organizing activities at its atomic energy installations.²¹⁹ In 1944, two American Federation of Labor unions filed with the

217. Tenure, of course, does not always exist in Federal employment. Temporary appointments are not uncommon and certain types of labor such as day labor may be employed only on job basis.

218. STRAUS, *THE DEVELOPMENT OF A POLICY FOR INDUSTRIAL PEACE IN ATOMIC ENERGY* 8 (National Planning Association Pamphlet, No. 71, 1948), a most useful historical account. See also *REPORT ON LABOR PROBLEMS RELATING TO CONTINUITY OF PRODUCTION IN THE ATOMIC ENERGY COMMISSION PROGRAM*, published as part of Exhibit No. 1, *Hearings before the Joint Committee on Atomic Energy on Labor Policy in Atomic Energy Plants*, 80th Cong., 2d Sess. pt. 1 (1948). (Hereinafter cited as *REPORT ON LABOR PROBLEMS*).

219. "The wartime atomic energy program was carried forward by the Manhattan Engineer District with the highest order of secrecy. The work was highly compartmentalized. It was designed that workers in one section of a building should not know what those in another section of the same building were doing. . . . Early in the course of the work, it became apparent to MED that the organizational activities of the labor unions might be a threat to continued security of information that was then held under security restrictions. When unions were started among the operating contractors, workers from many departments would meet and discuss their work. These discussions sometimes involved confidential details of the jobs of several individuals in connection with questions involving wage rates and other personnel policies. Another factor relating to union activity was the necessity for continuous operation of certain plants because of the nature of the processes. A stoppage of only short duration in some of the plants could have had serious results. The transition from an unorganized plant to one with a recognized bargaining agent necessitates a change in the basic employer-employee relationship. The risk of a work stoppage while this transition was being accomplished could not be taken." *REPORT ON LABOR PROBLEMS* *supra* note 218, at 118.

National Labor Relations Board a petition for certification as bargaining representatives at the Clinton Engineer Works (Oak Ridge).²²⁰ When the Board in turn scheduled a public hearing, the Army asked President Roosevelt to intervene and protect the security of the operation. At a White House conference held on December 5, 1944, union leaders agreed to withdraw their NLRB petitions, pledged themselves to continue their efforts to recruit the craftsmen needed for this important work, and at the same time promised to refrain from organizing the workers at the various Manhattan District plants.²²¹ Although no bargaining units were established at these plants in the war years, the construction work was carried out under "understandings between the contractors and unions." These "understandings" though oral were "definite and well enforced" and provided that the contractor would take only union labor as long as the unions were able to supply men; when this supply was exhausted, he was free to hire others.²²²

The unions kept to their pledge of cooperation and abstention from organizing activities throughout the war. Though union membership in the nation increased from ten million in 1941 to fifteen million in 1946²²³ and though the CIO and the AFL were engaged in rival organizing drives, atomic energy installations were exempted from the campaigns. "Nevertheless," as one authoritative observer points out, "the rapid growth of unions throughout the country created pressures on this non-union vacuum which were certain to be felt once the secrecy barriers were removed. Meanwhile, many factors within the installations helped to augment the pressures. There was the rapid expansion typical of so many war industries, which created pay inequalities, poor housing arrangements, suspected health hazards, and similar breeding grounds for employee grievances. Military supervision and strict security restrictions added irritations to the pent-up labor relations."²²⁴

As soon as the war ended, the unions began pressing for their customary rights of organization and recognition. By February of 1946, the Manhattan District had agreed to normal NLRB processing at Oak Ridge (subject to certain security safeguards). It withheld union certification at other atomic energy plants until the Oak Ridge procedures could be tested and, as a result, Hanford, Los Alamos and other installations did not grant full union recog-

220. The unions were the International Brotherhood of Electrical Workers and the International Brotherhood of Firemen and Oilers.

221. REPORT ON LABOR PROBLEMS *supra* note 218, at 118.

222. STRAUS, *op. cit. supra* note 218, at 9. See also *id.* at 10 for description of the Brown-Patterson plan of June, 1944 as an example of union aid in recruitment.

223. BUREAU OF LABOR STATISTICS, HANDBOOK OF LABOR STATISTICS (1947).

224. STRAUS, *op. cit. supra* note 218, at 10. For discussions of workers' grievances, see for example *The United Chemical Worker* (newspaper of the United Gas, Coke and Chemical Workers—CIO), May 27, 1946, p. 3; June 24, 1946, p. 3; and September 30, 1946, p. 2.

dition until September 1948.²²⁵ In the 1946 elections at Oak Ridge, the NLRB certified the United Chemical Workers (CIO) at K-25, the gaseous diffusion plant operated by Carbide and Carbon Chemicals Corporation; it recognized the Atomic Trades and Labor Council (AFL) at the Clinton Laboratory for general nuclear research (the project known as X-10), then operated by the Monsanto Chemical Company. Collective bargaining agreements were concluded in December, 1946, and were approved by the AEC after it had succeeded the Manhattan District in January, 1947.²²⁶

To that point no serious labor difficulties had arisen, but the scene soon changed. Certain basic predicaments grew out of the nature of the atomic energy industry itself, predicaments not altogether without precedent in other great industries but here aggravated by a variety of circumstances. The atomic energy program was vast and complex; it embraced many different kinds of operations. Yet within the confines of a single installation, such as Oak Ridge, these diversified operations were drawn into one project. Under normal conditions, labor problems involving the wages or fringe benefits of different industries require separate treatment. Moreover, the solutions of these problems are in part facilitated by the distinctness of craft or skill, by the fact that there are different employers, by geographical separation, by differences in custom and historical evolution. In the atomic energy industry these ordinary boundaries were either non-existent or "blurred"; a source of trouble to the unions, to management and to the Commission. "For example, construction rates typically are higher than those for similar crafts doing maintenance work. This differential is due in part to the greater stability and the more generous fringe benefits usually enjoyed by maintenance workers. But at atomic energy plants construction work has been fairly continuous since the start of the program, and individual workers often work as many days during the year as maintenance crews. To add to the confusion, maintenance crews often are remodeling equipment that may involve work very similar to new construction. There is a constant tendency to break down the distinction between maintenance and construction rates, thus creating problems in union-contractor relations as well as in inter-union relationships."²²⁷ Many other examples of this "blurring of union boundaries"

225. See REPORT ON LABOR PROBLEMS *supra* note 218, at 119.

226. Letter from the members of the United States Atomic Energy Commission transmitting the Initial Report of the Commission, January 31, 1947, p. 9. SEN. DOC. No. 8, 80th Cong., 1st Sess. (1947).

227. STRAUS, *op. cit. supra* note 218, at 17. But *cf.* a later view in The Laborer (newspaper of the International Hod Carriers, Building and Common Laborers Union of America—AFL) Vol. 4, No. 7, July, 1950, which indicates that builders can usually expect no more than an average of 200 working days a year; and that wage differentials between construction and maintenance workers at atomic energy plants are to the disadvantage of the construction workers.

can be found.²²⁸ And the rivalry between AFL and CIO made its usual contribution to labor tensions and unrest.²²⁹

One of the causes of friction at Oak Ridge lay in the fact that workers at one plant, X-10, enjoyed greater wage and other benefits than workers engaged in the two other major operations.²³⁰ At the start it had been thought that X-10 workers faced greater hazards than other employees, and the differential favoring them had been continued even after experience showed the apprehension to be groundless.

The rapid succession of contractors for the various operations during the early post-war period was another disruptive factor.²³¹ Some labor leaders

228. "Another example of this blurring of union boundaries occurs in the operations of the transit systems necessary in an atomic area that includes residential and plant sites covering hundreds of square miles. The transit contractors try to negotiate wages and working conditions similar to the going rates in near-by towns. At Oak Ridge, the transit contractor patterns its operations after those of Knoxville bus lines. But within the boundaries of the K-25 plant at Oak Ridge there is a small, separate bus system operated by drivers who are members of K-25's CIO bargaining unit. Their rates are different from town transit scales and are related to those of chauffeurs and drivers of automotive equipment in accordance with the job evaluation system covering the whole industrial operation. Since the drivers of both operations are likely to live next to each other—in similar houses provided by the AEC—the comparison of wage rates is certain to occur. After all, the Union representing the workers with the lower rates can argue along these lines: The AEC is ultimate employer, why should there be any differential for similar jobs." STRAUS, *op cit. supra* note 218, at 17-18.

229. Originally both the AFL and the CIO were equally critical of the Commission's labor policies (see for example testimony of James A. Brownlow for AFL, and of Benjamin Sigal for CIO, *Hearings before the Joint Committee on Atomic Energy on Labor Policy in Atomic Energy Plants*, 80th Cong., 2d Sess. pt. 1 (1948); yet while the CIO is still outspoken in its criticism not only of labor, but of all AEC policies (see Reports of Resolutions Committees of the Eleventh and Twelfth Constitutional Conventions of the Congress of Industrial Organizations, 1949 and 1950), the AFL has become much more restrained. The AFL, which has a far greater membership than the CIO among workers in atomic energy plants, tends to criticize the AEC only as specific issues arise, and the journals of its affiliated unions, unlike those of the CIO, make scant reference to labor problems in the Commission's plants.

230. "Everything that could mess up labor relations was there [Oak Ridge]; and among them were different wage rates for the same kind of work paid to rival unions and unions that were not only rivals but very close rivals, cases where the elections had been won by just about 51 to 49 and the defeated union was trying to reverse it. . . ."

William Davis, *Hearings before a Subcommittee of the Joint Committee on Atomic Energy on Recommendations on Labor Relations Policy in Atomic Energy Installations*, 81st Cong., 1st Sess. 13 (1949).

231. "Monsanto negotiated the first union contract at X-10 with the AFL, continuing previous benefits. During the fall of 1947, Monsanto began the discussion for a renewed contract but, when the University of Chicago was announced as its replacement, Monsanto withdrew in favor of the University negotiators. A contract was almost completed by the University representatives, again following the general terms of the old Monsanto agreement, when it was announced that a last minute switch had given Carbide & Carbon the contract for all three Oak Ridge installations. Carbide & Carbon began at once to strive for uniformity at K-25 and X-10 on the K-25 pattern." STRAUS, *op. cit. supra* note 218, at 20.

felt that local representatives of the Atomic Energy Commission were inclined to identify themselves with contractors, a situation common during the war when military officers assigned to factories frequently became almost a part of the contractor's organization. "In virtually every installation visited by the President's Commission, it was discovered that the relationship between the Atomic Energy Commission labor relations officer and the operating contractors was extremely close, and that teamwork of the highest order—of the kind that probably would have taken great effort to plan and foster had it been intended—had developed."²³² However desirable a close working relationship between the contractor and Commission officials may be, it is obvious that if the unions are given any grounds for suspecting that the Commission is not being neutral in settlement of disputes, labor-management relations must break down completely.

In addition, the tight security regulations of the Atomic Energy Commission were ever present as a cause for irritation. If management refused to discuss certain problems on the ground of secrecy and security, "there was a tendency for the union to suspect that security was being used by management as a convenient screen for its own purposes."²³³ Again one must not fail to take into consideration a whole range of other reasons, stretching from labor's general fear of monopolies to more immediate and practical problems such as housing and rent.²³⁴ Altogether, as one noted labor arbitrator is said to have

232. *Id.* at 40. Local Atomic Energy Commission officials instead of occupying a "neutral role" in the union-contractor relationship felt "they should become strong partisans on the side of the contractor. The argument runs along the line that the AEC has been entrusted with the supervision of the atomic job by Congress. The AEC in turn, hired contractors to operate this job; and the contractors, in turn, hire labor to perform the individual tasks. Therefore, the better job, the more economical job done by the contractor, the better AEC has fulfilled its mission." *Id.* at 40-1. That local union officials mistrusted this "altruistic" partisanship is easy to understand. The fact that the Atomic Energy Commission officially favored collective bargaining did not appreciably diminish union suspicion and resentment.

233. *Id.* at 58.

234. The isolation of the several AEC production centers, the need to provide on short notice housing and other community facilities for tens of thousands of employees, the makeshift, substandard character of the housing thus provided and the inadequacy of the services: these and kindred difficulties have from the outset plagued the atomic energy enterprise in its relations with labor. In light of these unfavorable conditions and to attract workers to the plants, the Manhattan Engineer District throughout its tenure maintained housing rentals at a low level. The Commission adhered to this level until it was felt that improvements in housing, community facilities and services justified a rise so as to make rents "comparable to those in surrounding areas." TENTH SEMI-ANNUAL REPORT 15-16 (1951). The schedule of increases was not well received; the unions charged, among others, that inequities had been perpetrated, that wage increases failed properly to reflect the higher housing rents, that the improvements claimed by the AEC were insufficient to justify the revision, that, on balance, working and living conditions at AEC installations remained unattractive and therefore warranted continuance of what was acknowledged to be a government subsidy towards housing costs.

remarked, "If the devil himself had been hired to concoct a mixture of ingredients designed to produce the worst possible labor relations, he could not have improved on the Oak Ridge proportions."²³⁵

But undoubtedly the most important single reason for the labor disputes which arose was the coupling of the Commission's fixed policy of conducting its production operations through private contractors with its equally fixed policy of not tolerating strikes of any kind in any sector of atomic energy operations. Anyone can draw up for himself a list of the labor-management miseries bound to stem from these joint stands. What was the status of workers employed by contractors engaged in construction or management for the AEC? Were they private employees free to bargain collectively on all conditions of their employment? Or was theirs a "make-believe" contract and were they really government employees?²³⁶ If collective bargaining was the sole procedure available to them to secure wage increases and other benefits, and if at the same time the ultimate recourse to a strike was denied them what practical chance did they have to gain their ends? Why, in the circumstances, would a private contractor find it desirable, much less necessary, to grant union demands? It is true that under a cost-plus contract he would lose nothing in the immediate instance by granting wage increases or fringe benefits, but he would be alert to the possibility that concessions proffered in an AEC project might appear to haunt him at the next contract negotiation in his home plant.²³⁷ What role did the Atomic Energy Com-

At Savannah and Paducah the housing and community problems referred to presented themselves in almost pristine form; the difficulties faced by the Manhattan District in breaking ground for an entirely new installation were recapitulated and for the first time confronted the Commission. The Commission early announced its intention "not to build and operate permanent housing for plant personnel [at either site], but to rely on private enterprise and existing local communities to supply housing, community facilities, and services." *Id.* at 17. How effectively this plan would work remained to be seen. That it was altogether consistent with the Commission's general orientation in operation and management was clear; even the Commission conceded, however, that the "facilities and services situation" was highly unfavorable and the prospect of speedy improvement unlikely. In calling for help on Congress and Federal bureaus such as the Housing and Home Finance Agency, the AEC emphasized that unless reasonable accommodations could be provided it would be impossible to complete the plants on schedule or to operate them properly. *Id.* at 18-19. There was little doubt that conditions at both installations would provide fresh fuel for labor-management-AEC controversies.

235. William Davis, quoted in STRAUS, *op. cit. supra* note 218, at 20.

236. "Is there any reality in the thought that these atomic energy plants can be run by private contractors and have the conditions of private industry, or is it just make-believe, and are they really government employees?"

William Davis, *Hearings before a Subcommittee of the Joint Committee on Atomic Energy on Recommendations on Labor Relations Policy in Atomic Energy Installations*, 81st Cong., 1st Sess. 15 (1949).

237. See for example the testimony of Silas W. Pickering II, Director of Industrial Relations, Carbide and Carbon Chemicals Corp., *Hearings before the Joint Committee on Atomic Energy on Labor Policy in Atomic Energy Plants*, 80th Cong., 2d Sess. pt. 1, 88-94 *et seq.* (1948).

mission envisage for itself in this area? Was it to be mediator? Supreme arbiter? Policeman?—Or hapless bystander? The spectacle of the Commission attempting to wield its production monopoly so gracefully that private industry would mistake it for the staff of free enterprise had its funny side.²³⁸ In effect, the policies of the Commission created a hybrid labor class whose unlucky members were denied important advantages enjoyed by government employees and were at the same time enjoined from invoking the principal bargaining weapon of private employees. They were not granted the status of government employees because, among other reasons, the Commission was committed to giving its contractors full rein in the hiring, firing and supervision of workers—the free enterprise precept; on the other hand, the exercise of the normal right to strike, while not legally prohibited, was dismissed by the Commission as “unthinkable”²³⁹—the sovereignty precept.

In this “heads I win, tails you lose” situation, the unions soon showed themselves capable of harboring unthinkable thoughts.

II. CONFLICTS AND THE ATTEMPTED SOLUTION

The first important labor dispute occurred at Oak Ridge within a few weeks after the Commission had taken over in 1947. The United Gas, Coke and Chemical Workers local demanded renegotiation of its contract with Carbide and Carbon Chemicals Corporation, contractor for K-25, on the ground of inequities and also that misrepresentations had been made by Carbide at the time the original agreement was signed. Many months of futile bargaining followed, attended by bitter charges and recriminations. The Commission kept hands off, declining requests from labor that it force the contractor to accept arbitration of certain questions under negotiation. But a strike vote on December 4, 1947 promptly brought strong Commission intimations that measures would be invoked to insure continuity of production. A week later a new agreement was reached and there was no strike.²⁴⁰ The press, however, spread the word that a dangerous strike in one of the nation's most important atomic plants had been averted only at the last moment. The Congressional Joint Committee on Atomic Energy experienced considerable uneasiness over the entire labor situation in atomic energy production plants. This apprehension was intensified in March of 1948 during discussion of a labor contract, originally made with the Monsanto Chemical Company, and now being renegotiated with Carbide which had taken over

238. See testimony of William H. Davis, *Hearings before a Subcommittee of the Joint Committee on Atomic Energy on Recommendations in Labor Relations Policy in Atomic Energy Installations*, 81st Cong., 1st Sess. 2-3 (1949).

239. See Lilienthal's statement in *Hearings before the Joint Committee on Atomic Energy on Labor Policy in Atomic Energy Plants*, 80th Cong., 2d Sess. pt. 1, 60 (1948).

240. For a synopsis of these events see REPORT ON LABOR PROBLEMS *supra* note 218, at 119-20.

the X-10 laboratory at Oak Ridge. When negotiations collapsed and a strike again threatened, President Truman established a Board of Inquiry to look into the dispute.²⁴¹ The President later reported to Congress that the Board had found that "grave danger to the national safety would result if the operations of the laboratory (X-10) were interrupted,"²⁴² whereupon the Government asked for and obtained under the Taft-Hartley Act an injunction forbidding the Carbide and Carbon Chemicals Corporation to engage in a lock-out or to change the terms of the contract and forbidding the workers to strike.²⁴³ It was now obvious that labor-management relations in the atomic energy program were precarious and it seemed probable that they would continue to deteriorate.

As this pattern of stalemate developed, the Joint Committee itself felt compelled to investigate. In March of 1948 the Committee held a number of hearings on labor policies in atomic energy plants. The witnesses before it were Lilienthal, representatives of the American Federation of Labor, of the Congress of Industrial Organizations, and of the Carbide and Carbon Chemicals Corporation, and Cyrus S. Ching, director of the Federal Mediation and Conciliation Service. The testimony exposed a basic dilemma of the Atomic Energy Commission.

Lilienthal's defense of the Commission's contract policies was along lines already familiar. A decision had been reached at the very beginning, he said, to operate the entire atomic energy project "by a wide diversity of private and non-federal institutions, of which industry would be an important part."²⁴⁴ (This he characterized as "making the best" of the monopoly provisions of the McMahon Act.) It thus followed, Lilienthal asserted, "that when an industrial concern and a union of its employees, or an organization of its employees, are discussing wages and working conditions and are unable to reach a conclusion, the Commission shall not step in and settle that controversy or direct its contractors specifically how to settle that controversy."²⁴⁵ For the Commission to adopt a contrary course would be to "interfere" with the

241. On March 5, 1948, President Truman issued Executive Order 9934 establishing a Board of Inquiry under the Labor Relations Act, at his request both parties to the strike situation agreeing to maintain the status quo until March 19. The Board of Inquiry made its first report March 15. *FOURTH SEMIANNUAL REPORT* 54 (1948).

242. Message from the President of the United States transmitting *Report to Congress Concerning the Labor Dispute Which Recently Existed At The Oak Ridge National Laboratory*. H. R. Doc. No. 726, 80th Cong., 2d Sess., iii (1948).

243. On March 19, 1948 Federal Judge George C. Taylor sitting at Knoxville, Tennessee, granted an 80 day injunction restraining some 900 members of the Atomic Trades and Labor Council (AFL) from work stoppage at the Oak Ridge National Laboratory and the Carbide and Carbon Chemicals Corporation from disturbing the status quo of the existing labor contracts. *United States v. Carbide and Carbon Chemicals Corp.*, 21 LAB. REL. REP. (Ref. Man.) 2525 (E. D. Tenn. 1948).

244. *Hearings before the Joint Committee on Atomic Energy, on Labor Policy in Atomic Energy Plants*, 80th Cong., 2d Sess. pt. 1, 19 (1948).

245. *Ibid.*

independence of contractors and to jeopardize the possibility of attracting "the best grade of American industry and science and other institutions in this undertaking."²⁴⁶

The witnesses representing the two labor organizations took a different view of the Commission's responsibilities. Less concerned than Lilienthal with broad vistas, they held that certain immediate problems had to be settled and a coherent position defined. The main question was: how was labor to secure its rights in the atomic energy industry? It was pure folly to consider, as members of Congress had suggested, passing a law outlawing strikes at atomic energy plants. A prohibition of this kind would be futile, unenforceable;²⁴⁷ besides, the national emergency provisions of the Taft-Hartley Act were wholly adequate to avert catastrophic work stoppages. Continuity of operations, the union representatives agreed, was essential; but it was equally important for the AEC to formulate a policy under which the workers, having relinquished certain rights in the interests of national security, could look to the Commission to supply the deficiency in their bargaining power. Whereas neither the AFL nor the CIO regarded compulsory arbitration as desirable, both groups made it plain that they were prepared voluntarily "to arbitrate every issue that comes up under any circumstances" and deemed it the responsibility of the Commission to adopt an "over-all labor relations policy" covering the key factors of "wages, hours, working conditions, grievances."²⁴⁸ (The CIO, as will be seen further on, was actually much more out of sympathy with the fundamentals of AEC contract policy than Benjamin C. Sigal of the Gas, Coke and Chemical Workers Union saw fit to indicate in his testimony.)

246. *Id.* at 20-21. Lilienthal thought it essential for contractors to carry on their work for the Government just as they did in their private business. ". . . if the policy that we are pursuing is successful," he said,

"then various plants and laboratories will develop a sense of responsibility for doing a good efficient job, not simply falling into the habit of saying, 'Well, Uncle Sam pays the bills, so it doesn't matter.' It is true that the bills are paid by Uncle Sam. But if we can place upon these contractors a sense that this is something that they are asked to carry on, that it should be a matter of pride and of industrial prestige that, say Carbide and Carbon Chemicals Corporation, or General Electric, or any of these numbers of large industrial contractors, are doing a job as they would do it in their private operations, rather than simply going through routine motions and having bills paid by Uncle Sam, then we will have a strong industry. If not, the whole contractor relationship will fall down and become simply a form rather than having substance."

It may be observed that, whether or not it was desirable for the Atomic Energy Commission to make "important decisions" on labor matters, it did *in fact* have the final say on the contractors' expenditures, thereby determining the wages paid, and on the working conditions maintained at its installations.

247. See testimony of Benjamin Sigal, Counsel, United Gas, Coke and Chemical Workers of America (CIO), *id.* at 76.

248. Testimony of Sigal, *id.* at 78; also, James A. Bromlow (for AFL) *id.* at 38, 41, 53.

Both labor witnesses criticized the Commission for the muddle of its ideas on labor relations. James A. Brownlow, Secretary-Treasurer of the Metal Trades Department of the American Federation of Labor told the Joint Committee "[i]f [we] are going to have Government operation of atomic energy plants, let us have it; and if we are going to have contractor operation, let us proceed on that basis; but certainly we cannot have both. We cannot submerge what we are pleased to term free enterprise and then on the other hand advocate it."²⁴⁹ A few days later, Mr. Sigal told the Committee that if the Commission insisted on having private contractors operate atomic energy installations "then certain necessary consequences flow from that decision. If private enterprise is to be made an integral part of this program, that private enterprise applies to workers as well as the contractors. And if it is considered to be desirable to impinge on the rights of the employees, there must be a correlative limitation on the rights of employers."²⁵⁰ Mr. Sigal also explained the extent to which the attitude of local AEC officials was responsible for the tension at Oak Ridge and for the union's decision to vote a strike: "The membership of the union wanted to demonstrate that they were not second-class citizens, as the circumstances seemed to indicate the officials of the government thought that they were. There was resentment against the attitude of the AEC in telling them, 'You have got to settle your disputes the way any employees of private contractors settle their disputes'; and on the other hand saying, 'You cannot strike.'"²⁵¹

The testimony of Cyrus S. Ching was succinct and in substantial agreement with the union views. He favored a uniform plan of welfare benefits for all "vital" atomic energy plants (*i.e.* "the operations where it is concluded that we cannot have a strike"); the determination of wages should, he felt, be left to collective bargaining, but with some individual or board ("agreed on by the parties, or a set-up that might be established by the Congress itself, if necessary") having the final and binding decision if, after bargaining, the

249. *Id.* at 37.

250. *Id.* at 71. Further describing the Oak Ridge controversy, Sigal told the joint committee:

"We had a meeting with the full Commission on December 1st of 1947, at which time the top officers of the national CIO and the national officers of our organization, the Gas, Coke, and Chemical Workers, were present and the whole matter was explored as to the desirability of intervention by AEC in the dispute.

"The AEC gave us no final answer then, but the conversation indicated very clearly that the AEC thought it ought not to intervene; that this was a dispute between a private employer and a representative of employees, which should be settled in the fashion usual in private industry, and that the AEC ought not to intervene in a labor dispute, and that is how the matter was left.

"On the other hand, it was also made clear that a strike would be unthinkable.

"That is the dilemma in which the union was placed. And the Union was supposed to find an answer to that dilemma." *Id.* at 63.

251. *Id.* at 66.

parties could not agree.²⁵² He recognized what the Commission was either unable or unwilling to recognize: First, that pronouncing strikes "unthinkable" did not make them so and that, in a showdown, individual workers could not be forced to stay on the job even if their unions were severely punished or destroyed. Especially was this true if workers felt that the Commission was guilty of favoritism towards management and insincere in invoking security as the justification for depriving labor of its rights. Second that "when the right to strike is given up, and you are expecting to get the best people, there must be some other compensating factor there to take the place of those things that are found usually in private industry."²⁵³ Third, that since AEC had the veto power over labor contracts, "whether they (the Commission) like it or not, they are going to be forced"—and *should* be forced, he implied—"to accept considerable responsibility in this field."²⁵⁴ The hearings were useful but inconclusive. Several members of the Joint Committee showed that they understood labor's difficulties, that they sympathized with the unions as victims of an inconsistency of AEC policies. "In other words," as Representative Holifield remarked to Sigal, "they [the AEC] took away the economic pressure which is allowed by law. They took that away from you, or in a moral sense prohibited you from using it, and left you with nothing but conversation to obtain your results."²⁵⁵ This was a telling summary of the problem, but no one offered a clear and generally acceptable way out. The Committee adjourned without making recommendations, without even a statement of findings. Hickenlooper indicated that additional hearings "probably" would be held; in fact, nothing further was done. The problem was too thorny to meddle with in an election year.

Meanwhile, the 80 days of the Taft-Hartley injunction on the X-10 dispute had run out and there was no sign that the parties had "cooled off" or were approaching a settlement. In a tense meeting with William Green, AFL President, Lilienthal flatly asserted that work in the X-10 laboratories would be continued "at all costs" even if strike-breakers had to be used.²⁵⁶ Finally, the Federal Mediation and Conciliation Service was able to effect an agreement. The underlying conflicts, however, were not resolved, the bitterness and tension remained, the possibility of fresh disputes was imminent.

On June 18, a few days after the crisis at X-10 had been averted, the President reported on the matter to Congress. The dispute, he said, had raised questions "as to the sufficiency of present collective bargaining methods in atomic energy installations."²⁵⁷ He intended, therefore, to appoint a commission to study "the broad code of conduct which should be observed

252. *Id.* at 110-11.

253. *Id.* at 110.

254. *Id.* at 113.

255. *Id.* at 64.

256. STRAUS, *op. cit.* *supra* note 218, at 4-5.

257. See Special Presidential Message to Congress, June 18, 1948.

by management and labor in their relations with each other in the vital program." Shortly thereafter the membership of the commission was announced. Its chairman was William H. Davis, prominent New York attorney who during the war had served as chairman of the War Labor Board, as head of the Office of Economic Stabilization and in other important posts. Its two other members, also well qualified, were Aaron Horvitz, New York lawyer and arbitrator, and Edwin E. Witte, Chairman of the Department of Economics at the University of Wisconsin. The Commission began at once on its six months' assignment to examine AEC labor relations and make recommendations looking toward the "peaceful and orderly settlement of labor disputes in government-owned, privately-operated atomic energy installations."

On April 18, 1949, after numerous meetings, field trips to the major AEC installations, hearings, conferences with government, industry and labor officials, and a careful review of earlier policy reports,²⁵⁸ the Davis Commission submitted its findings to the President. Its principal suggestions were first, that except in matters of security, where the Atomic Energy Commission has absolute authority, "the normal and typical aspects of wages, hours and working conditions . . . shall in government-owned, privately-operated atomic energy installations be left to collective bargaining between management and labor free from governmental interference"; second, that management and labor "wholeheartedly" accept a "special responsibility" to seek by "voluntary procedures and mutual agreement" peaceful settlement of disputes and "forego all resort to strikes, lockouts, and other interruptions"; third, that a Labor Relations Panel be established (three impartial members to be appointed by the President from nominations submitted to him by the Commission) with power to take jurisdiction of any dispute "which collective bargaining and the normal processes of conciliation have failed to resolve and which threatens to interfere with an essential part of the atomic energy program."²⁵⁹

258. One of the more important of these was the Garrison-Morse-Taylor report (Jan. 4, 1947) to the Atomic Energy Commission on Oak Ridge labor problems. It recommended that the Commission establish "uniform pension plans, vacation schedules, sick benefits and similar fringe items uniformly throughout the industry," the acceptance of these conditions to be mandatory for contractors and unions. STRAUS, *op. cit. supra* note 218, at 31. See also Exhibit No. 1, *Hearings before the Joint Committee on Atomic Energy on Labor Policy in Atomic Energy Plants*, 80th Cong., 2d Sess., 120 (1948), p. 120.

259. REPORT OF THE PRESIDENT'S COMMISSION ON LABOR RELATIONS IN THE ATOMIC ENERGY INSTALLATIONS (1949). The REPORT further recommended that:

"at Government-owned, privately operated atomic energy installations every recognized union and every contractor be required to agree that there shall be no interruption of production or services or changes without agreement in the terms and conditions of employment existing when the dispute arose before the Panel takes jurisdiction and that after the Panel takes jurisdiction in a dispute, existing terms and conditions of employment will be maintained without change and no action will be taken to impede production or services in any way so long as the

The President's Commission did not think legislative action necessary, but suggested that if the proposed measures failed after having been tested, the Atomic Energy Commission should make recommendations to Congress on the basis of experience thus gained.²⁶⁰ The Labor Relations Panel was established by the President shortly after the report of the Commission on Labor Relations appeared.²⁶¹ Between April of 1949 and June 1951, the Panel had referred to it 20 or more cases, some of which involved brief stoppage

Panel retains jurisdiction and for an additional period of 30 days if in any case the dispute remains unsettled and the Panel makes final recommendations . . ."

The obligations of the parties under the agreement were to end as to any particular dispute

(1) if the panel refused to take jurisdiction within 15 days after either party requested the Panel to do so

(2) if at any time more than 30 days after the Panel took jurisdiction either party notified the Panel of its desire to terminate as to that dispute its obligation under the agreement, and within 20 days thereafter the dispute had not been disposed of by mutual agreement or the Panel had made no recommendations

(3) whenever the Panel had refused to take jurisdiction or had announced that it had terminated its jurisdiction.

260. The AEC (1951) has made no such recommendations to Congress. Shortly after the Davis Report was made public, the Commission issued an "Interim Statement of the AEC in Respect to Its Role in Labor Management Relations at Atomic Energy Installations." Dated May 3, 1949, this statement expressed general agreement with the Davis Report, but pointed out that the AEC was charged with the "over-all responsibility for the atomic energy program," which required review not only of matters of security, but also of the labor expenses under cost-reimbursement contracts. The Commission promised a *future* statement "defining its role in labor-management relations at atomic energy installations," the purpose being to resolve the conflict between the AEC's over-all responsibility and the government's policy of a minimum of interference in labor-management bargaining, by providing "an outer framework" within which the interested parties might negotiate. Under such established principles the AEC staff would not participate in negotiations between the parties, but would or would not accede to cost-reimbursement according to whether the labor contract came within the AEC "framework." Contractors and "recognized" unions were to be consulted in drafting the code; meanwhile the AEC's general policy in matters of labor expense was "that employment conditions be established with reference to conditions in a reasonable segment of comparable industry in the area."

261. On April 26, 1949, President Truman announced that he had appointed Mr. Davis, chairman of the Special Commission on Labor Relations, as chairman of the Atomic Energy Labor Relations Panel. A few days later the President named as the other members of the Panel, Mr. Horvitz and Mr. Witte who had served with Mr. Davis on the special commission. In November, 1950, the Panel requested the President to appoint three additional members in order "to expedite the handling of critical problems that arise on short notice." Frank P. Douglass, Oklahoma City attorney and former chairman of the National Mediation Board; John T. Dunlop, a Harvard professor and consultant to the Panel, and Godfrey P. Schmidt, New York City attorney were thereupon appointed. NINTH SEMIANNUAL REPORT 82 (1951).

of work.²⁶² In some of the disputes the issues were settled after the Panel had been notified but before it undertook mediation; in several others, the Panel mediated a settlement without having to make recommendations. Up to January 1951, formal recommendations had been issued in only six cases.²⁶³

Thus far the Panel has proved itself a useful instrument. There have been no serious strikes; disputes have been resolved, mainly, by voluntary procedures; there has been no clamor for special legislation. In part the success of the Panel may be ascribed to the skill of its individual members. They have consistently acted calmly and rationally in a field surcharged with hysteria.

While the Panel's recommendations do not have the force of law, it is difficult, in view of the emotional aura surrounding any activity even remotely related to the atomic energy program, for either labor or management to reject its findings. Thus the Panel has profited from the prevailing atmosphere without exploiting its uglier potentialities.²⁶⁴

Certainly the recommendations of the President's Special Commission were not in themselves so novel, so ingenious or so profound as to provide a comprehensive formula for the settlement of the extraordinarily complex labor relations problems of atomic energy. The report consists of a number of familiar generalities which are not particularly acute, though perfectly sound. It recommends a familiar device—the Panel—which, in principal unobjectionable, is manifestly unsuited to the construction of long-range, basic policy in labor relations. The Atomic Energy Labor Relations Panel is an emergency unit for settling emergency problems; it works under and for the Commission and the Commission may disregard its advice at any time or abolish the Panel entirely. When he announced the establishment of the Panel, President Truman said that the plan was being adopted for a trial period of two to three years and that it was subject “to termination at the discretion of the

262. For a list of the cases and their disposition, see *REPORT TO THE PRESIDENT BY THE ATOMIC ENERGY LABOR RELATIONS PANEL* (June 1, 1949 to October 31, 1949), *SEVENTH SEMI-ANNUAL REPORT*, Appendix 8 (1950); *REPORT etc.* (Nov. 1, 1949 to May 31, 1950), *EIGHTH SEMI-ANNUAL REPORT*, Appendix 9, (1950); *REPORT etc.* (June 1 to Nov. 30, 1950), *NINTH SEMI-ANNUAL REPORT*, Appendix 7, (1951). *REPORT etc.* (Dec. 1, 1950 to June 1, 1951), *TENTH SEMI-ANNUAL REPORT*, Appendix 7 (1951).

263. See *SEVENTH SEMI-ANNUAL REPORT* 36 (1950); *EIGHTH SEMI-ANNUAL REPORT* 177 (1950); *NINTH SEMI-ANNUAL REPORT* 80-1 (1951); *TENTH SEMI-ANNUAL REPORT* 135-42 (1951). (This Report also contains a useful recapitulation of labor disputes).

264. “Then, in the end, we make recommendations which nobody is bound by, not the AEC or the contractor or the union. In my opinion those recommendations come so close to being compulsory that it would be very difficult to tell the difference between them. I just don't see the AEC or the contractor or the union turning down such a recommendation unless some terrific emotional question were involved. And, if that happens, the Panel ought to have too much sense to make a recommendation.”

William H. Davis, *Hearings before a Subcommittee of the Joint Committee on Atomic Energy on Recommendations on Labor Relations Policy in Atomic Energy Installations*, 81st Cong., 1st Sess. 18-19 (1949).

Atomic Energy Commission." The fact that the Panel was to depend for its continued existence on the Commission's pleasure, instead of being an independent Government body was one of the elements that labor leaders resented in the new labor-management policy.

The Special Commission made the particular point that the Panel is to be used sparingly. Only after voluntary negotiations and conciliation methods have failed, does the Panel entertain jurisdiction. And even after taking jurisdiction, it may refer cases back for "exploring other possibilities of settlement." In this way "the creative possibilities of responsible collective bargaining" are to be preserved.²⁶⁵

In the Special Commission's report, as in the record of the Panel's activities, one can discern what the Panel's executive secretary has described as a deliberate "fuzziness" as to when the Panel might act and what procedures it might invoke in an individual case.²⁶⁶ The Panel may or may not decide to take a case; it may take jurisdiction over certain points in a controversy and reject others; after assuming jurisdiction, it may mediate or return the dispute for further private negotiation or for conciliation procedure; it may request the National Labor Relations Board to assume certain responsibilities; it may issue or withhold formal recommendations after hearing a dispute.

It has been argued that there is much merit in the vagueness of the Panel's charter because, "if the possible results of submitting a case . . . were very indefinite, then the party would be less eager to relinquish its own responsibility for working out a solution."²⁶⁷ But the argument seems superfine and precarious; it is doubtful that a fuzzy administrative device, however skillfully executed, is the proper remedy for problems engendered by confused and contradictory policies.

How have labor and management reacted to the Report of the President's Commission and to the actions of the Labor Panel? There is plentiful evidence that the unions as well as the contractors are dissatisfied with the present system, that earlier tensions persist, and that a major breakdown in labor relations at atomic energy plants, though unlikely, is not impossible. It should be pointed out, however, that the panel system as such is not the primary target of attack. The labor discontent is deep and arises from disagreement with basic tenets. Though union officials, at the top levels especially, have cooperated with the Atomic Energy Commission, there is reason to suppose that this is only a surface harmony and that large segments of

265. "[I]t is a basic purpose of the proposed plan that resort to the Panel is not to be thought of as a customary or an easily available part of the management-labor-relationships." REPORT OF THE PRESIDENT'S COMMISSION ON LABOR RELATIONS IN THE ATOMIC ENERGY INSTALLATIONS, April 18, 1949.

266. STRAUS, *op. cit. supra* note 218, at 64.

267. *Ibid.*

labor profoundly disapprove of major AEC policies.²⁶⁸ The AEC's position is made the more awkward by the earlier and continuing experience of TVA, where Government's direct relationship to organized labor has been so satisfactory to the parties concerned.²⁶⁹

268. The attitude of one major segment of organized labor toward AEC policies is revealed in the official actions of the CIO at its Eleventh Annual Convention in 1949. A resolution devoted to the problems of atomic energy said:

"The Atomic Energy Commission, acting on a 'chosen instrument' theory has contracted most of the work in atomic energy, both experimental and productive, to private corporations operated for profit. At the direction of the Atomic Energy Commission, those corporations, in their relations with labor, invoke national security as a shield of immunity to limit or deprive labor of the exercise of full and free collective bargaining and of the right to strike, but their profits from this and other work are treated as the fruits of free enterprise.

"This practice of contracting out Atomic Energy Commission work, if continued, will result in the accumulation by private corporations of atomic energy know-how to further strengthen their already monopolistic position in our economy and their disproportionate influence on public policies, legislation, and administration.

"The TVA method of direct operation, which in practice permits genuine free collective bargaining between the agency and free labor unions, has been proved to be as satisfactory as the present AEC contract system is unsatisfactory."

The resolution further demanded that "either by taking over direct operation and production of its own work or by amending its labor relations and security policy, the Atomic Energy Commission establish labor relations similar to those which have recognized the role and function of free labor unions as democratically chosen representatives of the employees and have proven successful from every point of view." CIO Resolutions on Foreign Policy, 11th Constitutional Convention. Cleveland, Ohio, October 31, November 4, 1949, Resolution No. 22, Atomic Energy.

At its 1950 Convention the CIO adopted a substantially similar resolution. It attacked sharply the proposal by the Monsanto Chemical Company to enter the field of private plutonium production (using government-owned uranium and reselling the plutonium and power to the Government and the power to other consumers) as "the first bold step in a long-range plan to transfer the control of atomic power from public to private hands;" it criticized Lilienthal for having "now gone over to the side of private production of atomic power, and to justify his repudiation of the principles of TVA which he inspired and of the integrity of AEC which formerly he upheld—has falsely compared the administrative functions of AEC, directed and controlled as they are by an elected President and an elected Congress, with the dictatorship methods of Soviet Russia;" it called upon the President and the AEC to "reduce and eliminate the practice of contracting out Atomic Energy Commission work to private corporations and to adopt the TVA policies and methods of direct operation and production;" it demanded also that either by "taking over direct operation and production or by amending its labor relations and security policy, the Atomic Energy Commission establish labor relations similar to those which recognize the role and functions of free labor unions as democratically chosen representatives of the workers, and put an end to the unauthorized and unAmerican practice of turning over to private employers FBI reports containing unverified, unevaluated, secret charges against employees." Report of Resolutions Committee, Twelfth Constitutional Convention of the Congress of Industrial Organizations. Chicago, Illinois, November 20-24, 1950: pp. 27-9.

269. The Tennessee Valley Authority carries on its work, including construction, with its own employees under its own merit service system. During most of its existence since

Labor officials realized soon after the war that large scale strikes in atomic energy plants would not be tolerated. They also saw that local union leaders would have difficulty controlling discontented workers simply by appeal to patriotism and the national welfare. The AEC consistently turned down union requests for intervention on the principle that labor relations "was a matter to be settled between the contractor and the union"; the contractors could afford to be unimpressed with threats of local strikes. Under the circumstances it is understandable that, although it is contrary to their fixed policy, the AFL and CIO both came to the reluctant conclusion that something much akin to compulsory arbitration was the only substitute for the strike. To be sure they formally rejected "compulsory" arbitration as a thoroughly noxious and ineffectual device "as this implied legislation and a standing injunction against strikes"; on the other hand they advocated, as we have noted, that the AEC compel contractors to agree to "voluntary" arbitration, in return for which the unions would agree "voluntarily" not to strike.²⁷⁰ This was a face-saving stratagem to avoid legislation but in practical effect the new "voluntary" arbitration closely resembled the old compulsory methods. The Davis Commission refused to recommend compulsory

1933, the Authority has employed an average of 15,000 persons, reaching its high point during the war years in 1942 when it employed 42,000 persons. In 1949 it employed 13,174 persons. Contrary to the AEC policy of conducting all of its operations through contracts with private industry, the Board of Directors of TVA in 1933 (led by Lilienthal) decided to recruit its own labor force. Outlining the history of this decision, a Senate Committee in 1949 reported that TVA at the time of the construction of the Norris Dam abandoned the usual Federal-agency practice of low-bid construction in favor of the so-called "force account" policy, in which the Authority did its own hiring, purchasing, supervising and so on. The reasons given were that low-bid contracts, being difficult of execution, did not make for quality work, nor did they save money in the long run. The Board felt that the new policy would allow for experimentation and an accretion of special knowledge and skill which would be impossible in dealing with a variety of low-bid contractors. In the long run, there would be greater savings through the utilization by a single builder (TVA) of experience gained in successive projects. A further reason was that the Authority could draw on local labor thus benefiting the area, while other contractors would be likely to use crews imported from other sections of the country. And indeed this policy, which now governs all major TVA projects, and makes the Authority responsible for the "quality and conditions of work, rates of pay, overtime, employment, and training," has "established confidence and trust on the part of both management and labor." In evaluating TVA labor-management relations, the Committee found them "relatively free of strife and discord," attributing this among other things, to the fact that TVA was the direct employer, that it had established excellent relations with the unions with which it deals, and that labor trusted the motives of TVA. The report concludes by pointing out that this healthy condition is due in part to the awareness of employees and union leaders of the public nature of the TVA, and the great benefits it has brought to the whole watershed area; but mainly it has been nourished by the individual workman's realization that the Authority has throughout dealt fairly with labor, takes thought to its grievances, problems and needs, and is invariably responsive to them. *Labor Management Relations in TVA, Report of the Joint Committee on Labor-Management Relations*, REPORT No. 372, 81st Cong., 1st Sess. (1949).

270. STRAUS, *op. cit. supra* note 218, at 55.

arbitration on the grounds, first, that it would fail as a "positive guarantee" against strikes and, second, that if this remedy were available no dispute would be settled by collective bargaining but instead would be "pushed on to the arbitrator for decision." The proposed union substitute of modified compulsion was presumably rejected for the same reasons. The Davis Commission line of argument coincided with the position of the AEC as well as with that of most of the large contractors. And although the panel system differs in several important²⁷¹ respects from compulsory arbitration, contractors, while willing to comply with its procedures, have predicted that, if labor disputes were to increase, the unions would place little reliance on normal bargaining but would press for panel intervention, and especially for recommendations by the panel which would have the force of an arbitration award. "In the event that compulsory arbitration became the practical result, these same contractors said they would be forced to reconsider their continued participation in the atomic program."²⁷²

Labor unions, have not been entirely satisfied to accept the Commission's general policy as laid down in its Interim Statement that "employment conditions be established with reference to conditions in a reasonable segment of comparable industry in the area." On at least one occasion a union, refusing to accept the wage rates established for comparable work in the area, succeeded in obtaining higher wages.²⁷³

271. Secure in the knowledge that strikes would not be permitted and that the AEC, fearing to lose their services, would support their position, the major AEC contractors were flatly opposed to compulsory arbitration. In testimony before a Subcommittee of the Joint Committee on May 3, 1949, William Davis said:

"The attitude of management among the big concerns, Carbide and Carbon, and General Electric and Westinghouse, for instance, was opposed to compulsory arbitration. They said, 'Let them strike.'"

Hearings before a Subcommittee of the Joint Committee on Atomic Energy on Recommendations on Labor Relations Policy in Atomic Energy Installations, 81st Cong., 1st Sess. 6 (1949). A similar opinion, somewhat vehemently expressed, may be found in *The United Chemical Worker*, June 12, 1950:

"Bowling to the urgent needs of national defense, members of Local 288 . . . voted . . . to accept intervention of the Atomic Energy Labor Panel . . . Action of the local contrasted sharply with that of the corporation (Union Carbide and Carbon) whose attitude in everything except spoken words was: 'To hell with national defense. Strike and be damned to you'. . ."

272. STRAUS, *op. cit.* *supra* note 218, at 74.

273. On April 15, 1950, members of the International Hod-carriers, Building and Common Laborers Union, AFL, went on strike at a construction job at Oak Ridge because of dissatisfaction with their wages, although they had been set at the rates prevailing for common labor in the nearby Knoxville area. Their representatives pointed out that maintenance labor employed at Oak Ridge under another contract received higher hourly wages than that established under the Knoxville schedule and denied that their union was tied to the Knoxville rates. Under an arbitration agreement eventually reached, the Oak Ridge union won its point and was granted the same hourly wages as those received by maintenance labor at Oak Ridge. See Case No. 9, EIGHTH SEMIANNUAL

There is deep concern also over the possibility that the "no-strike" policy of the Commission may be extended from "vital" atomic energy installations to industrial plants, privately owned, whose product is used in manufacture of fissionables or in some other phase of nuclear technology. Lilienthal, in his appearance before the Joint Committee early in 1948, stressed that there were "certain suppliers of materials to the Commission who are operating plants which were built for and are operated exclusively in connection with the atomic energy program." He felt that a strike in such plants was as "unthinkable" as a stoppage at the production centers of Oak Ridge and Hanford.²⁷⁴ Since in the course of time a considerable segment of American industry may in one way or another be drawn into the atomic energy complex, the area of operations where stoppages are held "unthinkable" is likely to spread.²⁷⁵ Thus again in the name of security there may be further serious encroachments on the freedom of labor, a trend certain to be accentuated during a period of international tension.

The Davis Commission in its study of atomic energy labor-management relations had taken note that the AEC insisted it must be assured that all participants in the atomic energy program are loyal to the United States, "including those whose participation involves the exercise of negotiating and disciplinary authority over bargaining units."²⁷⁶ This was the reason for its declarations that the AEC must have "absolute and final authority in these

REPORT 223-5 (1950). For an example of labor's opposition to the use of "area rates" as a guide to wage policy, see *The United Chemical Worker*, June 12, 1951, p. 2:

"C and C (Union Carbide and Carbon Corporation) which merely operates the (Oak Ridge) plant under a contract guaranteeing its fee, stubbornly points to 'area rates' as justification for holding down wages in the incomparable atomic installations. There simply is no area comparison. No other Tennessee plant subjects its workers . . . to the security screening, character probing and qualification requirements established at Oak Ridge. Probably no other workers are called upon to submit to lie detector tests and a constant personal snooping such as applies to Oak Ridge workers. Few American workers—let alone on area comparison—are called upon to work among products whose potentialities are still largely in the realm of speculation as the products of Oak Ridge."

274. *Hearings before the Joint Committee on Atomic Energy on Labor Policy in Atomic Energy Plants*, 80th Cong., 2d Sess. pt. 1, 16 (1948).

275. Lilienthal described the critical area in sweeping, and in what labor understandably regarded as alarmingly vague, terms.

"These ['vital' plants] include a rather wide segment of American industry; so that we are not taking in all of the difficulties, the necessary difficulties of the problem, I think, unless it is kept in mind that an interruption for any period of all of the production of some of these essential materials that go into this undertaking may be just as serious—in fact a possible case could be made out that in some respects it would be more serious—than stoppages in certain parts of the Commission's own installations." *Ibid.*

276. Exhibit No. 1, *id.* at 117. Also REPORT OF THE PRESIDENT'S COMMISSION ON LABOR RELATIONS IN THE ATOMIC ENERGY INSTALLATIONS.

matters" and that neither security rules nor their administration were to be regarded as matters for collective bargaining. Thus, the AEC's "non-intervention" policy in labor relations admitted of one notable exception: in cases involving the activities of certain left-wing unions the Commission intervened decisively and without delay. In two instances the Commission forbade contractors to recognize unions whose officials had failed to take non-Communist oaths.²⁷⁷ The ban occasioned controversy between the head

277. Acting under its mandate to guarantee the security of atomic energy installations, the Commission in 1948 forbade two of its contractors to recognize unions whose high officials had failed to take the non-Communist oath required by the Labor Management Relations Act (Taft-Hartley Law). The unions involved were the United Public Workers of America, CIO, at the Argonne National Laboratory, operated by the University of Chicago; and the United Electrical, Radio and Machine Workers of America, CIO [UE], at the Knolls Atomic Power Laboratory in Schenectady, N.Y., operated by the General Electric Company. The Commission said that the failure of the union leaders to file non-Communist oaths and the information that certain union officers had "alleged Communist" affiliations had raised questions of loyalty and security that required action by the Government. Even though the officials concerned were not employed on the atomic energy project, they were, the Commission felt, in a position to "exercise administrative, negotiating or disciplinary authority over bargaining units of atomic energy workers." David E. Lilienthal, in letter to Charles E. Wilson, President, General Electric Company, September 27, 1948, FIFTH SEMI-ANNUAL REPORT 192 (1947). These views were also expressed by the Commission in letters written to William B. Harrell, Business Manager of the University of Chicago, and to Chairman Paul M. Herzog of the National Labor Relations Board, in September of 1948. (The correspondence will be found in *id.*, Appendix 9.)

On October 1, after the Commission had published these letters Philip Murray, President of the CIO, protested the "blacklisting" of the two CIO-affiliated unions "without prior consultation either with the interested parties or with responsible officials of the CIO." He said that the CIO could not "accept the principle that it is either within the power of the Commission or in the public interest for the Commission to deny unions bargaining rights on the basis of a unilateral determination by the Commission of the loyalty of union officers." While granting the necessity for atomic energy security, Murray declared that the Commission was "usurping its functions" in prejudging the merits of the cases involved. Lilienthal, in reply, stood by the Commission's action on the grounds that not only had officers of the unions concerned failed to take the non-Communist oath but that the Commission had information of "alleged Communist affiliation or association of various officers" of the unions. See FIFTH SEMI-ANNUAL REPORT 195-6 (1949). Meanwhile, tart communications were exchanged by Lilienthal and Albert J. Fitzgerald, General President of the United Electrical Workers. Fitzgerald accused the Commission (a) of playing politics, (b) of making "utterly false and groundless insinuations" against UE, (c) of "slandereous imputations of disloyalty" and of harboring a friend of the "fascist Franco dictatorship in Spain" on the Commission's loyalty review board. Lilienthal again insisted that the Commission would not recognize the UE unless its officials took the non-Communist oath. Shortly thereafter the UE filed suits for damages and to restrain the Commission and the General Electric Company from interfering with the union's collective-bargaining status. The case was dismissed on May 5, 1949, on petition of the Department of Justice. 84 F. Supp. 640.

Although Murray and others strongly protested the Commission's actions, the issue became somewhat blurred when the CIO expelled the United Electrical, Radio and Machine Workers of America from membership at its November convention in 1949,

of the CIO and Lilienthal and roused ill feeling throughout the several CIO unions, though most of them were not directly involved.

There can be no question of the Commission's absolute authority and responsibility where security is involved. But it is less obvious that the Commission has only to declare that security is involved for its judgment to become unassailable. One may doubt that the Commission acted properly when it peremptorily extended its jurisdiction beyond workers on atomic energy projects to the officers of unions to which they belong. This leads to the application of the guilt by association doctrine on a fantastic scale, as a result of which hundreds of thousands of workers may (and have) become tainted because several officials of their union are accused of Communist sympathies. There is no need to ascribe untoward motives to the Commission; here as elsewhere it is the victim of political circumstance. At the same time, it must be granted that the bitterest union foe has never contrived a better device than this one, of mass taint by association, for crippling the labor movement. Union leaders know the potential dangers of the principle here adopted by the Commission, but they have found themselves unable, in today's super-heated atmosphere, to be effective either in exposing the dangers or combatting the policy.

An even more questionable practice ascribed to the Commission by the CIO is that of furnishing to its private contractors so-called "derogatory information" contained in FBI reports on their workers *who already have been approved by AEC for security clearance*.²⁷⁸ There is considerable evidence to support this charge, and it is a charge which involves actions not merely reprehensible but in flagrant defiance of law and of repeated Presidential edicts against making secret federal investigatory files available to official bodies, much less to private persons.

and similarly banished the United Public Workers of America in February of 1950. In both cases the charge was Communist domination. A new union, the International Union of Electrical Radio and Machine Workers, CIO, [IUE] was established and won bargaining rights for employees of the Knolls Laboratory at Schenectady in May 1950. (The new union, IUE, has issued a number of leaflets bearing such slogans as: "The US Government Threw UE out of its Atomic Plants!" and "The US Government Says: Our Country Can't Trust UE," in its campaign to entice members away from UE.)

278. "This information [made available to the contractor] casts a cloud on the personal character of the worker concerned, and is furnished to his employer despite the fact that it has not been verified or evaluated by FBI (as FBI admits), it does not bear upon his loyalty or his eligibility as a security risk, and it is not made known to the worker himself so that he may refute the charges against him.

"This 'invite procedure' as AEC calls it, is completely unauthorized by law and, as AEC admits, is not necessary as a security measure. The employer is, in effect, invited by AEC to discharge the workers involved, and these unevaluated secret reports have been used by employers as an excuse to discharge workers active in union affairs. In so doing, the employer can say he acts with AEC approval and can claim immunity from NLRB action. The secrecy surrounding the procedure makes it practically impossible for unions to prove discrimination in such cases and to secure redress. The kind of information furnished to private corporations by AEC under this 'invite procedure' is obtained

III. SUMMARY

The AEC's labor problems can be summarized briefly. Labor relations at atomic energy plants are today far from satisfactory. The difficulties spring from historical factors, from conditions inherent in the industry, from the basic contract and labor policies of the Atomic Energy Commission. The construction of the Commission's two large installations at Savannah and Paducah, and other additions to plant under the accelerated rearmament program multiply the labor problems and impose further strains on a chronically uneasy situation.²⁷⁹

The Commission is committed to the principle of private operation of government plants and communities. Workers are therefore hired by and are responsible to the contractor-operators. To this extent they are private employees. But on the issue of the right to strike—the basic labor weapon when bargaining fails—atomic energy workers are regarded as government employees. The Commission, in other words, will not tolerate work stoppages threatening continuity of operations; at the same time it is strongly disinclined to interfere with private contractors in their relations with the unions.

Since labor is in effect unable to press its demands by means of strikes or strike threats, various substitutes to protect labor's bargaining rights have been proposed. These include compulsory arbitration and outright government operation of atomic energy plants in the manner of TVA. The latter solution has never received serious consideration from the Commission; compulsory arbitration, opposed by AEC, industry and labor, was rejected by the Davis Commission. Instead, the President set up on the Davis Commission's recommendation, an Atomic Energy Labor Relations Panel empowered to take jurisdiction of disputes when all attempts to agree have failed, and to make "recommendations" for settlement. Judging by tangible results to date, the Panel has been successful, but neither labor nor management is content with this compromise. The unions are dissatisfied with the basic labor orientation of the AEC, with the inequality of union and management strength, with the impotence of labor to enforce its claims, with many aspects of contractor wage and fringe benefit policies now supported by the Commission. In the opinion of many labor leaders, the Panel, however effective it may be in settling individual disputes, is in no position, as a mere

from files which the FBI has assembled for the sole use of interested government agencies and treats as confidential. Such information has been denied to the courts and the Congressional Committees, yet AEC turns it over to corporations for such use as they or their agents may wish to make of it."

Report of Resolutions Committee. Twelfth Constitutional Convention of the Congress of Industrial Organizations, Chicago, Illinois, Nov. 20-24, 1950, p. 28.

279. Reference has been made in note 234 *supra* to the impact on labor relations of housing shortages, and inadequacy of services and facilities at Savannah & Paducah. The complexity of recruitment problems should also be noted. See TENTH SEMI-ANNUAL REPORT 46-8 (1951).

appendage of the Commission and serving at its pleasure, to effect fundamental reforms and to place labor in the atomic energy plants on an equitable and secure basis. Contractors discover another set of reasons for regarding the Panel as an unsatisfactory solution to the labor-management problems of the atomic energy industry. They fear the gradual transformation of the panel system into a system of compulsory arbitration. They are especially apprehensive of the possibility that a panel finding in a major labor dispute would necessitate concessions on wages and fringe benefits in their home plants as well as in their atomic energy operations.

The dilemma of the Atomic Energy Commission, the anomalous status of the unions, the anxieties of the contractors are not to be relieved by any simple formula. These unfortunate circumstances are in large part ascribable to the Commission's interpretation of the intent of the Atomic Energy Act. The Act refers in general terms to the desirability "so far as practicable" of promoting free enterprise in the development of atomic energy. The Commission, under political pressure, has chosen to interpret this as a *mandate* to turn over all its operations to private industry. Nowhere in the history of the Act is there a basis for this sweeping inference. It is clear that policies and actions based on this interpretation must enmesh the Commission in extraordinary difficulties. The grant of immense power to the Commission by Congress was predicated on the conviction, repeatedly stated, that production and related operations of the atomic energy program were vital to the national security and welfare. This criterion takes precedence over every other standard set in the Act. In other words, since continuity of atomic energy operations is essential and work stoppages are a national hazard, it is the Commission's responsibility to run its plants in such a manner that the former is assured, and the risk of the latter minimized. The Commission has ample authority to accomplish these ends, if not by direct government operation, then by establishing basic standards for labor contracts and by intervening directly if necessary to settle labor-management disputes on equitable terms. It has rejected these steps as constituting a threat to the "integrity" of "free enterprise" and the independence of its contractors. Given the choice between adopting a labor policy which might be regarded as a threat to "free enterprise" and a hands-off policy threatening the efficiency and continuity of the whole atomic energy program, the Commission seems to have decided that the latter alternative is the lesser menace to the national welfare.

Finally, it is to be noted that the continuity of operations of atomic energy plants, as of any industrial undertaking, depends ultimately on the morale of the workers concerned. Much more is involved in morale—contentment, to use a simpler word—than satisfactory working conditions, wages, hours, welfare plans, bargaining machinery. The unusual circumstances of the atomic energy industry—secrecy of many segments of the operation; isolation of plants and supporting communities; steady pressure from all sides

to accelerate production and improve efficiency, with the national security at stake—all these factors increase the vexations and multiply the problems of labor relations. Thus the Commission carries its difficulties to the breaking point, first by giving the unions reason to believe that, except for the sake of maintaining production and a good health record, it is less zealous in its concern over the contentment of workers than of its contractors; second, and more acutely, by using security as an excuse for engaging in practices that jeopardize not only the reputation and livelihood of individual workers but the future of entire large segments of organized labor. It is hard to resist the conclusion that in thus rousing the antagonism of labor the Commission has raised threats to security potentially greater than any it has averted by its formidable zeal in guarding against subversion and disloyalty in even the more rational of its precautionary measures.²⁸⁰

CONCLUSION

I have in this analysis taken the reader over a long path and forced him (if in truth I have not lost him) through many disagreeable thickets of detail. Yet for a closer understanding of the subject than is to be gained from the grandiose pronouncements of politicians and the vague generalities of officials, newspaper reports and magazine articles, such a journey, however arduous, is not to be avoided. It may be desirable, nevertheless, lest perspective be lost, to add a few words of summary.

One may debate whether it was wise after the war to assign to the Federal Government the development as well as the control of atomic energy. A conservative Congress argued the question for months and answered it in

280. The Commission has failed thus far to make any definite statement describing its labor policy, making precise what it conceives to be the equitable and practical principles of labor-management relations. The Interim Statement (see note 260 *supra*) and similar utterances on labor policies are grandiose and fall considerably short of the standards of clarity and unambiguity the Commission is wont to insist upon as regards even minor regulation. The Commission has, however, been less deficient in defining its policies with respect to security in the sphere of labor relations. On May 8, 1951, there was issued "Security Policies and Practices in the Area of Labor Relations," a bulletin of meticulous detail as to various subjects, large and small, including the maintenance of security in NLRB proceedings; the loyalty clearance of NLRB examiners, arbitrators, counsel, Federal Mediation and Conciliation Service officials, union officials; the safeguarding and classification of hearing records where they contain restricted information; the investigation of *any* of the officials of a union, whose locals are engaged in atomic energy negotiations, where such officials are "of security interest to AEC because of proximity to classified work or because they exercise negotiating and disciplinary authority over employees. . . ." See NINTH SEMIANNUAL REPORT 82-4 (1951); TENTH SEMIANNUAL REPORT 49-52 (1951). The Commission has expressed the opinion that "while it by no means exhausts all the problems in this complex field . . . the issuance of this bulletin is a major step toward the desired goal of maintaining normal labor relations in the atomic energy industry while continuing to safeguard fully the security of the programs." As to the latter point there could be no doubt.

the affirmative. To this conclusion they were driven, only reluctantly, by their concept of the requirements of national security. One may ask whether, regardless of military needs, this resource, brought to practical use with public monies, should not as a matter of course be further exploited for the common good as a public trust. President Truman, Senator McMahon, and other leaders have taken this view; not a few have vigorously opposed it. One may suggest that the experience of the atomic energy program indicates the desirability of scrapping the main features of the Atomic Energy Act and opening the field for private development—subject only to regulatory scrutiny. Those who have urged such action—Mr. Lilienthal is a notable exponent—assert that the security safeguards which the 79th Congress had in the forefront of its thought in adopting the McMahon Act could be fully preserved at the same time the numerous advantages of private ownership and competition were conferred on the enterprise. Yet whatever may be debated, whatever questions are as yet unanswered, and issues unresolved, one fact is plain: a small but powerful segment of American industry is today the manager of the great bulk of the atomic energy program. Industry is operating the reactors and auxiliary plant at Hanford, the experimental power reactor at Knolls Point, the diffusion plants at Oak Ridge and Paducah, the tritium plant at Savannah, the materials testing reactors, the aircraft and submarine nuclear reactor programs; industry is producing plutonium, constructing factories and other installations, manufacturing and experimenting on weapons; industry is hiring, firing, fixing the wages and working conditions of 95 per cent of the atomic energy labor force; industry is running the communities; industry, in short, is making, expanding and learning the business of nuclear engineering. This is not a sinister fact; but it is a fact too little known, too little discussed, too little weighed. One may approve the present dispensation or deplore it; one can scarcely afford to neglect its implications.

The McMahon Act has from time to time been denounced as socialistic. It may be admitted that initially, and theoretically, this was its tendency—though mention of the word itself caused to shudder those who most ardently supported the bill in Congress. Nonetheless the majority took the position that even if the bill was the quintessence of Bolshevism, if it was essential to military security, it should be passed. (General Eisenhower, it is worth remarking, strongly urged its adoption—a factor of major importance in determining the final vote). But as the Act has been carried out, it is doubtful that Prince Metternich would have had reason to be alarmed over its revolutionary character. In all spheres of its responsibility the Commission consistently has striven to relieve itself of the odious encumbrance of monopoly, to reduce its scope, to delegate authority, to divest itself of control, to prepare the way for the entry of private industry. The AEC has shown its contractors unremitting solicitude, being thoughtful alike of their present interest and their future aspirations. They have had no cause for dissatis-

faction and indeed they have voiced none. From conversations with certain industry officials I gather they have been somewhat amused, if not puzzled, at the laments of publicists over the alleged exclusion of private industry from participation in the atomic energy project. It must be conceded, to be sure, that some large firms which desired to take part in the work have been left in the cold. But it was not the *federal* monopoly that froze them out. While this fact may not offer much consolation, it puts matters in a different light. The federal monopoly already having been transformed into a hybrid partnership in which private companies run most of the business while the AEC furnishes the money, there is sound basis for the expectation that not too long hence government will leave the partnership entirely, becoming, instead, the ideal customer—prepared both to subsidize and to buy the entire product of the business. In that event, there would be room for other private partners. There is ample evidence that this course is in contemplation. Studies are now underway as to how the plutonium business might be put on a profit basis.²⁸¹ The Commission is aware of shortcomings in its manufacturing record: waste, extravagance, serious lags in certain spheres of technology, and other forms of inefficiency. These blemishes, it is felt, would vanish under “the play of industrial initiative.” The impelling motive for the change is, of course, the “national defense.” But it is suggested also that if industry were to take over, the “broad commercial use” of atomic energy would be accelerated.²⁸²

Observe the curious evolution of national atomic energy policy. The initial predilection was to abrogate the wartime system, to eliminate the state from all but regulatory control, and to open the new resource to private industrial exploitation. Such a policy was opposed mainly on the grounds that it would jeopardize the nation's military defenses. Thereafter control legislation was adopted removing atomic energy from the domain of private enterprise. The control agency adhered to the formal requirements of the statute but provided for private participation by means of management contracts and other devices. After a few years of experience along this line, it is now suggested that the federal monopoly is itself the principal cause of shortcoming in the production program and that, so far from private exploitation of atomic energy weakening the country militarily, the transfer of the program to competitive enterprise would fortify security. In short the Atomic Energy Act adopted in the interest of national defense is now to be repealed in the interest of national defense. Symmetrical and very neat—but not very convincing. It is prudent to doubt that the gravest defects in the program are the outgrowth of federal monopoly; it is even less reasonable to anticipate their disappear-

281. See TENTH SEMI-ANNUAL REPORT 23-24 (1951) for discussion of studies assigned to four major industrial groups, regarding engineering feasibility of designing dual-purpose reactors (power and fissionable material), economic aspects, and possible role of industry in “designing, building, and operating such reactors,” as private enterprises.

282. See “*Profits & Plutonium*,” *Fortune*, Aug. 1951, p. 66 *et seq.*

ance when private business takes over. The problems of labor relations, to cite only one example, are not so easily solved. Moreover, the major social, economic, and international considerations relating to the development of atomic energy, expressly recognized in the Act itself, appear to have been forgotten in the plangent urge to instate the enterprise system. And what has happened, one may ask, to the innocent notion that the benefits of atomic energy should accrue to the nation as a whole—without the prior drain of private profits—since the resource itself was brought to fruition by public funds? Somewhere along the circular route of national policy this point got lost. Sooner or later the American people will demand to know where and why. The answer, I venture to say, will not be easy to frame.

APPENDIX TABLE I
U. S. ATOMIC ENERGY COMMISSION
SIX MONTH SUMMARY OF CONTRACT AWARDS*

JANUARY THROUGH JUNE, 1950

(Total Values in Thousands of Dollars)

Part A. PRIME CONTRACTS AND AEC PURCHASE ORDERS

1. Size of each contract	Small Business		Business Other Than Small Business		Educational and Other Nonprofit Institutions		All Other		Total All Classes	
	Number	Total Value	Number	Total Value	Number	Total Value	Number	Total Value	Number	Total Value %
Under \$2,000 (estimated).....	2063	612	2112	443	112	13	1	1	4238	1069 0.3
\$2,000 to \$25,000.....	101	808	102	946	199	2077	—	—	402	3831 1.1
\$25,000 to \$100,000.....	36	1678	50	2598	61	2690	2	93	149	7059 2.1
\$100,000 to \$500,000.....	18	3712	42	9469	20	4520	—	—	80	17701 5.2
\$500,000 and up.....	5	4343	31	266024	12	41112	—	—	48	311479 91.3
Total	2223	11153	2337	279480	404	50412	3	94	4967	341139 100.0
% of Value of All Classes.....		3.3%		81.9%		14.8%				100.0%
2. Type of work										
Supply	2148	5979	2224	19501	118	1848	—	—	4490	27328 8.0
Construction	35	3580	72	154016	2	1077	—	—	109	158673 46.5
Research & development.....	30	924	34	12292	282	46246	2	93	348	59555 17.5
Other	10	670	7	93671	2	1241	1	1	20	95583 28.0
Total	2223	11153	2337	279480	404	50412	3	94	4967	341139 100.0
% of Value of All Classes.....		3.3%		81.9%		14.8%				100.0%

Part B. SUBCONTRACTS AND CONTRACTOR PURCHASE ORDERS

1. Size of each contract	Small Business		Business Other Than Small Business		Educational and Other Nonprofit Institutions		All Other		Total All Classes	
	Number	Total Value	Number	Total Value	Number	Total Value	Number	Total Value	Number	Total Value %
Under \$25,000 (estimated)	76122	20599	40789	17671	838	47	583	139	118332	38456 40.5
\$25,000 to \$100,000.....	102	4580	120	5942	2	60	2	53	226	10635 11.2
\$100,000 to \$500,000.....	24	4063	41	8324	—	—	1	225	66	12612 13.3
\$500,000 and up.....	5	6360	16	25904	1	997	—	—	22	33261 35.0
Total	76253	35602	40966	57841	841	1104	586	417	118646	94964 100.0
% of Value of All Classes.....		37.5%		60.9%		1.2%		0.4%		100.0%
2. Type of work										
Supply	62136	19403	31800	35972	481	53	457	161	94874	55589 58.5
Construction	7367	14891	5638	16765	—	—	—	—	13005	31656 33.4
Research & development.....	5213	1066	2889	4658	338	1049	3	251	8443	7024 7.4
Other	1537	242	639	446	22	2	126	5	2324	695 0.7
Total	76253	35602	40966	57841	841	1104	586	417	118646	94964 100.0
% of Value of All Classes.....		37.5%		60.9%		1.2%		0.4%		100.0%

*Source: Based on *Monthly Summary of Contract Awards*, issued by the AEC Division of Finance, Progress Reports and Statistics Branch.

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THE ATOMIC ENERGY INDUSTRY

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JULY THROUGH DECEMBER, 1950
(Total Values in Thousands of Dollars)

Part A. PRIME CONTRACTS AND AEC PURCHASE ORDERS

1. Size of each contract	Small Business		Business Other Than Small Business		Educational and Other Nonprofit Institutions		All Other		Total All Classes	
	Number	Total Value	Number	Total Value	Number	Total Value	Number	Total Value	Number	Total Value
Under \$2,000 (estimated)	2556	756	1701	496	156	4	3	2	4416	1258
\$2,000 to \$25,000	139	867	121	946	61	669	—	—	321	2482
\$25,000 to \$100,000	22	1167	40	1917	10	339	1	25	73	3448
\$100,000 to \$500,000	14	2633	31	6895	12	3534	1	203	58	13265
\$500,000 and up	4	3064	26	311249	6	8043	—	—	36	322356
Total	2735	8487	1919	321503	245	12589	5	230	4904	342809
% of Value of All Classes		2.5%		93.8%		3.6%		0.1%		100.0%
2. Type of work										
Supply	2674	4358	1829	5828	121	3	—	—	4624	10189
Construction	26	2211	62	223343	—	—	1	25	89	225579
Research & development	24	1856	23	13583	123	12150	4	205	174	27794
Other	11	62	5	78749	1	436	—	—	17	79247
Total	2735	8487	1919	321503	245	12589	5	230	4904	342809
% of Value of All Classes		2.5%		93.8%		3.6%		0.1%		100.0%

Part B. SUBCONTRACTS AND CONTRACTOR PURCHASE ORDERS

1. Size of each contract	Small Business		Business Other Than Small Business		Educational and Other Nonprofit Institutions		All Other		Total All Classes	
	Number	Total Value	Number	Total Value	Number	Total Value	Number	Total Value	Number	Total Value
Under \$25,000 (estimated)	83779	31820	48772	31060	1780	225	534	180	134865	63285
\$25,000 to \$100,000	152	7576	281	13689	—	—	—	—	433	21265
\$100,000 to \$500,000	36	7081	121	24179	1	108	—	—	158	31368
\$500,000 and up	7	7279	45	110625	—	—	—	—	52	117904
Total	83974	53756	49219	179553	1781	333	534	180	135508	233822
% of Value of All Classes		23.0%		76.8%		0.1%		0.1%		100.0%
2. Type of work										
Supply	71325	32149	39663	71685	1540	210	497	178	113025	104222
Construction	6296	18003	6429	92589	2	—	—	—	12727	110592
Research & development	4732	2909	2201	14841	133	112	—	—	7066	17862
Other	1621	695	926	438	106	11	37	2	2690	1146
Total	83974	53756	49219	179553	1781	333	534	180	135508	233822
% of Value of All Classes		23.0%		76.8%		0.1%		0.1%		100.0%

*Source: Based on *Monthly Summary of Contract Awards*, issued by the AEC Division of Finance, Progress Reports and Statistics Branch.

APPENDIX TABLE III

U. S. ATOMIC ENERGY COMMISSION — SIX MONTH SUMMARY OF CONTRACT AWARDS, BY SIZE OF BUSINESS, TYPE OF CONTRACT, AND METHOD OF AWARD*

JULY THROUGH DECEMBER, 1950
(Total Values in Thousands of Dollars)

PRIME CONTRACTS (\$2,000 and more) Type of Contract	Small Business		Business Other Than Small Business		Educational and Other Nonprofit Institutions		Total All Classes	
	Number	Total Value	Number	Total Value	Number	Total Value	Number	Total Value
Cost Plus Fixed Fee.....	19	3862	28	300105	6	2574	53	306541
Cost	14	875	8	968	21	8759	43	10602
Unit Price	120	1735	148	10700	8	693	276	13128
Lump Sum	26	1259	34	9234	55	762	115	11255
Total	179	7731	218	321007	90	12788	487	341526
% of Value of All Classes.....		2.3%		94.0%		3.7%		100.0
Method of Award								
Negotiated	56	5110	76	302903	84	11399	216	319412
Competitive	123	2621	142	18104	6	1389	271	22114
Total	179	7731	218	321007	90	12788	487	341526
% of Value of All Classes.....		2.3%		94.0%		3.7%		100.0
SUBCONTRACTS (\$25,000 and more) Type of Contract								
Cost Plus Fixed Fee.....	2	722	33	64799	—	—	35	65521
Cost	2	85	8	1066	1	108	11	1259
Unit Price	108	8707	303	53010	—	—	411	61717
Lump Sum	83	12422	103	29618	—	—	186	42040
Total	195	21936	447	148493	1	108	643	170537
% of Value of All Classes.....		12.8%		87.1%		0.1%		100.0
Method of Award								
Negotiated	36	3708	163	83886	1	108	200	87702
Competitive	159	18228	284	64607	—	—	443	82835
Total	195	21936	447	148493	1	108	643	170537
% of Value of All Classes.....		12.8%		87.1%		0.1%		100.0

*Source: Based on *Monthly Summary of Contract Awards*, issued by the AEC Division of Finance, Progress Reports and Statistics Branch.

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